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JANUARY, 1892.

SAMBUCUS CANADENSIS.

BY FRANK F. LYONS, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.
No. 99.

Sambucus Canadensis is one of the best known of our indigenous drugs, and is widely distributed over this country from Canada to the Carolinas. It flowers from May to July and under the name of "elder flowers" is a common sight in low moist grounds, along fences and on the borders of small streams.

While various parts of the plant are medicinal, only the flowers are recognized by the Pharmacopœia. They are small, white, with a wheel-shaped corolla having five stamens inserted in the tube, and are arranged in loose five-rayed cymes.

In some parts of the country they have long been known as a carminative and diaphoretic, and for this purpose a favorite mode of administration is that of boiling in milk, to which liquid they seem to impart their medicinal as well as aromatic properties.

They have also been used as an application to inflamed surfaces, either as a cataplasm or an ointment made from an evaporated fluid extract. Probably their principal uses are as a perfume and a vehicle to disguise the taste of more disagreeable medicines.

The drug appears in commerce in pressed packages and dealers make a special effort to have them as white as possible. To do this it is necessary to dry them with the greatest care and as rapidly as possible.

A quantity of the drug was obtained from a reliable source, and subjected to a chemical examination with the following results:

A portion weighed and dried at 100° was found to contain 13.13 per cent. of moisture. A second portion on ignition yielded 6.67 per cent. of ash. Of this 12.95 per cent. was soluble in water, and 80.64 per cent. soluble in diluted hydrochloric acid. Fifty grams were then subjected successively to the following plant solvents: Petroleum ether extracted 3.32 per cent. by maceration. When heated at 110° to constant weight it was found to have lost a quantity of volatile oil, amounting to 0.5 per cent. of the drug. This oil may be obtained from the flowers by distillation with water, and at ordinary temperatures is a yellowish solid of about the consistence of butter, and having an aromatic odor and a slightly bitter taste. It is lighter than water, and somewhat soluble in it.

The remainder of the petroleum ether extract consisted of some fat soluble in 95 per cent. alcohol and of a crystalline greenish-yellow wax, melting at 40° , soluble in and deposited from hot absolute alcohol. Maceration with stronger ether gave a deep yellow liquid, which, upon evaporation, yielded 3.13 per cent. of extractive. This was digested with acidulated water, and the resulting aqueous liquid shaken successively with petroleum ether, ether and chloroform. The last solvent extracted an amorphous yellow compound, having the peculiar odor of the flowers and a very bitter taste.

This chloroform extract, when dissolved in water, produced no change with iron salts, but did reduce Fehling's solution. The yellow color of this extract was almost destroyed by acids, but restored to the deep yellow color of the ethereal extract by alkalis. The remainder of the ethereal extract was found to consist of a tasteless, inodorous resin, and to amount to 2.92 per cent.

Maceration with absolute alcohol gave a deep yellow liquid, which upon evaporation yielded 3.16 per cent. of extractive. One-half of this residue was found to be soluble in water to which it imparted an acid reaction. Ferric chloride was colored dark by this solution, but no evidence of tannin was obtained in it by gelatin and alum. The portion of the aqueous solution remaining after the above tests was agitated successively with petroleum ether, ether and chloroform. From the last solvent an amorphous yellow compound was obtained which, though odorless, had the peculiar bitter taste of the flowers. After heating with hydrochloric acid this substance readily reduced Fehling's solution.

Water extracted from the residual drug 21.48 per cent., consist-

ing of 6.48 per cent. of mucilage; 5.76 per cent. of glucose; 1.60 per cent. of saccharose, and 2.30 per cent. of a peculiar substance resembling tannin, as it was precipitated by gelatin and alum and gave a dark color with ferric chloride.

Dilute sodium hydrate extracted from the remaining drug 5.40 per cent. of pectin and albuminoids, and the remainder of the drug was found to be composed of 3.91 per cent. of lignin and 19.67 per cent. of celluline.

MULLEIN OIL.

Editor of American Journal of Pharmacy:

The December number of your Journal contains an article on "Mullein Oil" in which our firm, under cover of the words "A prominent homœopathic pharmacy," is charged with "petty deception to introduce an article at exorbitant prices." This charge is grossly unjust, uncalled for and libellous, and in common fairness we ask you to publish our reply to Mr. George M. Beringer's attack on our business and pharmaceutical honor. The best reply we can make is the plain facts of the case, which are as follows:

About eight years ago Dr. A. M. Cushing, of Springfield, Mass., published a paper in the *United States Medical Investigator*, of Chicago, on the subject of Mullein oil. We had numerous calls for the preparation and wrote to Dr. Cushing to ascertain how it was made. His reply, in substance, was that mullein oil is made by putting the freshly gathered mullein blossoms in a dark colored bottle, and exposing the bottle to the sun for four or five weeks. By this process, a sort of dry distillation, a dark colored, aromatic liquid is obtained, miscible with either alcohol or water, that is called "mullein oil" by the country people, which name neither Dr. Cushing nor ourselves saw fit to change. We may also state that to this liquid is added about 15 per cent. alcohol to prevent fermentation. We are quite well aware that the article is not an "oil" and have repeatedly explained what it is, and how made, in the journal published by us, *i. e.*, the *Homœopathic Recorder*. We also know that the Dispensatory mentions a "mullein oil" made by the country people of Germany, but as it is not an officinal preparation, nor as good a preparation as the one prepared according to Dr. Cushing's method, we cannot see that it is entitled to the name to the exclusion of the better article, and this especially as the German prepara-

tion is not an oil obtained from the mullein. The charge that the price is "exorbitant" is clearly the result of ignorance on the part of the man making it, and its falsity can be attested to by any one who has had any experience in making the article. In conclusion: The medical profession asked for a certain article made in a certain manner, and under a certain name; we simply complied with their demands and nothing more. Had Mr. Beringer had the courtesy to ask us for information on the subject instead of going about it in an underhand manner, as though he were a detective and we engaged in a criminal occupation, we would cheerfully have given him all the information on the subject we possessed.

BOERICKE & TAFEL.

Philadelphia, December 19, 1891.

FORMULAS FOR SEVERAL PHARMACEUTICAL PREPARATIONS.

CONTRIBUTED BY GEORGE M. BERINGER, PH.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Dec. 15.

These formulas are submitted in reply to queries received by the committee on pharmaceutical meetings.

Neutralizing Cordial.—This was formerly much used by the eclectics, and the formula as given in King's Dispensatory, p. 1285, is as follows:

Take of—

Rhubarb in coarse powder,	}	. . . . .	each two ounces.
Potassium carbonate, . . .			
Golden seal,	}	. . . . .	each one ounce.
Cinnamon,			
Refined sugar,			four pounds.
Brandy,			one gallon.
Oil of peppermint,			twenty minims.

Macerate the rhubarb, golden seal and cinnamon in half a gallon of the brandy for six hours with a gentle heat; then transfer the mass to a percolator and displace with the remaining brandy. The remaining strength, if there be any, can be obtained by adding water until the liquid comes off tasteless. To the percolate add the potassium carbonate, sugar and oil of peppermint, the latter having been previously rubbed with sufficient sugar to absorb it, and mix the two percolates.

It is stated that 76 per cent. alcohol may be substituted for the brandy.

Liquor Carbonis Detergens.—Hans Wilder published some years ago, in the *Druggists Circular*, the following :

Tincture of quillaia, 4½ pints.
Coal tar, 2 pounds.
Digest for 8 days and filter.

The tincture of quillaia is to be made by percolating two pounds of soap bark with 65 per cent. alcohol until one gallon of tincture is obtained.¹

The British Pharmaceutical Conference adopted in the *Unofficial Formulary* a formula for this preparation under the title of

Liquor Picis Carbonis (solution of Coal Tar) :

Take of—

Quillaia bark in No. 20 powder, 2 oz.
Rectified spirit,² a sufficient quantity.

Moisten the powder with a suitable quantity of the menstruum and macerate for 24 hours in a closed vessel. Then pack in a percolator and gradually pour rectified spirit upon it until one pint of percolate is obtained. To this add :

Prepared coal tar, 4 ounces.

Digest at a temperature of 120° F. for two days. Allow to become cold, decant and filter.

Prepared coal tar is commercial coal tar, which has been exposed in a shallow vessel to a temperature of 120° F. for one hour, stirring frequently.

Solution of the Four Chlorides.—(Formula of Dr. Wm. Goodell) :

Take of—

Hydrarg. bichlor. corros., grj
Liq. Arsenici chl., ℥xlviij
Tinct. Ferri chloridi, }
Acidi Hydrochlorici dil., } āā fʒiv
Syrupus Zingiberis, q.s. ad ʒiij

Misce. Sig.—One-half to one teaspoonful in water after meals.

¹ *Coaltar saponiné of Lebeuf.*—

R

Soap bark, 1 part.
Alcohol, 5 parts.

Heat to boiling and filter. Take 24 parts of this tincture, digest it for 8 days in a warm place with 10 parts of coal tar. Label this : Tincture for coaltar saponiné. To make the liquor use one part of the tincture to four parts of water.—J. W. ENGLAND.

² Rectified spirit, Br. Ph. contains 57 per cent. by volume of alcohol.

This preparation is being prescribed quite frequently, and several formulas disagreeing with each other have been published. The above is an exact copy of the formula recently received direct from Dr. Goodell.

Unguentum Boroglycerini.—The formula used by the writer is as follows :

Solution of Boroglycerin (50 per cent. in glycerin),	25 parts..
Petrolatum,	75 parts.
Oil of Rose or Rosegeranium, a sufficient quantity.	Mix.

CREASOTE PILLS.

BY JOSEPH C. ROBERTS, PH.G.

Read at the Pharmaceutical Meeting of the Philada. College of Pharmacy, Dec. 22.

In answer to the query as to the best excipient for making creasote pills, it may be stated that Tobisch¹ recommends the mixing of one part of creasote with two parts of unpeeled powdered licorice root, leaving the mixture stand for a few minutes, and then making up the mass with water as an excipient. Prior to this suggestion of Tobisch, we had tried his method only to obtain a failure. While the licorice root furnished absorbency, the mass formed was very friable, and lacked the necessary plasticity. Further, it was noticed, that on standing, the creasote was forced to the outer surface of the pilular mass, probably from a greater affinity of the licorice root for water, than for an oily liquid like creasote. To obviate these objections, the following procedure was adopted with excellent results. Mix two parts of creasote with three parts of powdered licorice root, and when absorption has taken place, add one part of powdered soap, and make up with syrup; samples of the two products are here presented for comparison.²

ELIXIR OF YERBA SANTA.

BY THEO. H. STROUSE.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Dec. 15.

Yerba Santa possesses very little medicinal properties, except, probably, in allaying slight inflammation of the bronchial mucous membranes, but its value is established for its property of disguising

¹ Zeitsch. Allg. Oest. Ap. Ver.; New Idea, 1891, 283.

² For formulas for creasote pills, see also Am. Jour. Pharm., 1889, 559, 1890, 17, and 1891, 292.

the bitter taste of substances like quinine and other cinchona alkaloids, in which use it has successfully stood the test against all other drugs. It is employed generally in a syrup or an elixir form. The preparation I have submitted is virtually a compound or aromatic elixir, indeed, my formula suggests polypharmacy to a high degree, but, after a number of experiments in its preparation, by employing different aromatics, etc., I finally concluded that this elixir was my ideal; and hope that if I have transgressed the rule of modern pharmacy—simplicity—the preparation itself will furnish the excuse. I herewith submit a sample, and a working formula:

R		
Yerba Santa,	.....	3 oz.
Sweet Orange Peel,	.....	1 oz.
Cardamon,	}	of each 1½ drachms.
Cloves,		
Cinnamon,		
Anise, . .	}	of each 1 drachm.
Coriander,		
Caraway,		
Red Saunders,	.....	½ "
Sugar (Granulated),	.....	1½ lbs.
Alcohol,	}	āā 6 f. ozs.
Glycerin,		
Distilled water sufficient for 2½ pints.		

Reduce the drugs to a No. 40 powder. Macerate for 24 hours and percolate with the mixture of alcohol, glycerin and water, until 2½ pints have passed through. Filter this solution and percolate it through the sugar.

THE PRESENCE OF COPPER IN SOME COMMERCIAL GALENICAL PREPARATIONS.

By F. W. HAUSSMANN, PH.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Dec. 15.

The introduction of numerous new remedies, the addition of new groups of galenical preparations to the Pharmacopœia within the last 20 or 30 years, and the demand made for these various preparations have added a new phase to the profession of pharmacy. It is impossible at the present day for the retail pharmacist to meet all demands made upon him in this line by the medical profession as well as the public, and he is forced to apply to manufacturers of these articles for a part of his supply. To what extent he is com-

pelled to take to this resource is shown by the number of these manufacturing firms in this country. Almost every wholesale drug house has a department of this nature attached, and it cannot be denied, that the pharmacist, especially in an urgent call, appreciates the service of such an institution. It is reasonable to assume, that in the manufacture on the large scale, other means than those of the retailer must be employed; that, with a view to both economy of time and money, alterations are employed both in working methods and the various utensils. It is of the latter, that our subject mainly treats.

Every pharmacist is acquainted with the fact that metallic surfaces, when in contact with liquids for some time, are more or less corroded, and that some of the metallic substance will pass in solution. This is also the case with the working utensils of the pharmacist, as well as of the pharmaceutical chemist working on the large scale. The latter employs in most instances vessels and general working tools made of copper, probably with a consideration as to durability and the facility of cleaning.

Accidentally the writer made the observation, that a contamination by copper was present in certain classes of preparations, especially fluid extracts. A brightly polished steel spatula, was left in contact with a mixture of several fluid extracts, and on removing the same a bright film of copper was found to be deposited upon the iron. Experiments were made to determine to what extent this was the case in the fluid extracts of one firm, and later this was extended to those of several others.

The method employed is very simple. A freshly polished, untarnished steel spatula is placed in about half an ounce of the suspected extract and allowed to remain some time. In some instances the copper will deposit without the necessity of acidulation, while again in others it does not take place, unless an addition of a slight amount of acid is made.

Small amounts of the metal are not detected by this method. The application of reagents would perhaps detect traces, but the separation of the vegetable constituents meets with considerable difficulty. For a rough examination it answers very well.

A number of fluid extracts obtained from eight different manufacturing firms were examined, the number varying from 16 in one case to only 2 or 3 in others.

The following are the figures obtained.

(1) Out of 16 different fluid extracts examined, 9 gave decided indication of the presence of copper, the other 7 only slightly so or none at all.

(2) Ten were examined. Not acidulated, the extracts from this source showed but little indication, but on the addition of a trace of sulphuric acid, in several very plain deposits were obtained. Out of the 10, only 4, however, gave a decided copper indication.

(3) Nine were examined. The same may be said as in the preceding group. Acidulated extracts gave very positive evidence. Out of the 9, five very prominent, the rest none or very slight.

(4) Five were examined, 3 of which contained copper.

(5) Five were examined, none of which appeared to contain copper. They were all alcoholic and had been standing at least 3 years.

(6) Four were examined. The menstruum was in two cases entirely alcoholic, one diluted alcohol and the other largely aqueous. None gave any indication of copper.

(7) Three were examined, each one contained copper, in one case very pronouncedly so.

(8) Only two were at disposal; both gave very bright deposits.

Out of the 8 different makes of fluid extracts, only two makes gave no sign of this metallic presence.

In examining the deposit upon the spatula a few sources of error are to be guarded against, viz: Fluid extracts containing yellow coloring matter, such as hydrastis or rhubarb, may stain the spatula to a similar color as that of the copper deposit. Closer examination, however, readily points out the difference, the uniform metallic deposit varying from the streaky one of such extracts or those containing resin. Daylight, it may be incidentally stated, is best for the examination.

In extracts from drugs containing vegetable acids, such as malic or tartaric, acidulation may usually be dispensed with, as in the presence of these the deposit, if any copper be present, quickly takes place. A fluid extract of sumach berries deposited copper in the short time of 10 minutes upon the spatula.

It is a well known fact, that copper salts are precipitants of tannin, the acetate being used in the quantitative estimation of that constituent. Fluid extracts, containing large amounts of it, gave

usually no indication of copper, and if the above be considered, the reason is obvious.

In some, which showed precipitation, the clear, supernatant portion gave no reaction for the metal, but if acidulated and the precipitate thoroughly mixed with the liquid, bright deposits soon formed.

Alcoholic fluid extracts, due to the non-corrosive action of that liquid, give hardly any indication, but a few have been found to contain traces.

The time of contact between the spatula and the extracts varied, in some cases being only 30 minutes, in others 6 to 8 hours. A number of commercial *solid extracts* were also examined with similar results. These examinations were made with both simple and acidulated aqueous solutions of the extracts. Acidulation is necessary in most cases, as, while some samples in simple solution readily gave indication of copper, others failed to show its presence, unless made slightly acid. This is particularly the case with tannin-containing extracts. Of the 10 samples examined of one firm, five contained copper, some very decidedly so.

Powdered Extracts have within the last ten years almost superseded the solid, possibly due to their more convenient division. A number of these were examined, but mostly with a negative result. Some appear to contain copper, but so small an amount, that a positive assertion cannot be made.

These 3 groups were the commercial preparations examined, others, such as abstracts, were not looked into.

The question may be asked, if the presence of this metallic contamination can have any decided, injurious effect upon the taker, also if it is present in sufficient amount to cause poisoning? This may be partly denied, as the preparations examined are seldom taken in large enough doses to contain a toxic dose of the copper, although some fluid extracts, as stated before, contain a comparatively large amount.

Another question would be, however, whether the *continued* taking of a copper-tainted fluid or solid extract may do any harm. Much has been said and written of the copper contaminated "soda water fountain," and if the so-called poisonings through this source be true, it may be fair to assume that not a single but frequently repeated draughts of the beverage have caused the difficulty.

It presents a singular complication that in the remedies of those who are requested to furnish the means of cure in possible cases of such metallic poisoning, the same deleterious substances are found, which cause disease and, perhaps, death in others.

One remedy is, however, in the hands of the pharmacist to guard against such a possibility, and it is to be regretted that at the present time it is so seldom used if not almost impossible—the method of self-preparation.

OXYGEN AND ITS MEDICINAL APPLICATION.

By JOSEPH W. ENGLAND, Ph.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Dec. 15.

It was a happy thought of the rational therapist to suggest the employment of oxygen gas as a remedial agent. To Dr. S. B. Birch, of England, belongs the credit of first using it in that country in 1857. Demarquay, in 1866, gave an exhaustive history of previous experiments together with much original matter, while in this country, Dr. S. S. Wallian, in 1869, and Dr. A. H. Smith, in 1870, made the subject one of special inquiry. All of these results, however, failed to enlist medical sympathy, and it was not until 1883, when a lengthy paper of Dr. Wallian's was published on the subject, that medical thought was directed towards its value. Since that time its use has gradually extended, until to-day it is very generally accepted as one of the best respiratory stimulants known. The reason for this is apparent, when it is stated that it gives the oxygen carriers of the blood—the red blood corpuscles—five times as much oxygen as they usually obtain from the air, and thus enables them to carry five times their usual quantity of oxygen gas to the tissues for oxidation purposes. With its increasing use, it is desirable that we, as pharmacists, should be thoroughly familiar with the manner of its making, so that the physician's wants can be readily supplied. With this object in view, this paper has been written.

Oxygen of itself is not difficult of preparation; the main thing in its making is care to prevent the presence of impurities. The most dangerous of these is chlorine gas, which must be excluded. Oxygen gas may be obtained commercially in steel cylinders containing 100 gallons of compressed gas, but as good and a far cheaper product can be made with one of the different oxygen apparatus

now on the market. The one in use by the writer consists of a wooden box having five parallel compartments in the back for wash bottles of a pint capacity, each bottle having a rubber cork with two tubes, one dipping down into the contained liquid, the other for the escape of the washed gas. Each of the bottles is connected with the other by means of rubber tubing, very much in the same way as in the Woulff bottle. The first bottle, however, is connected with the generator, and this needs to be described.

The generator is placed in front of the wash bottles and consists of two cylinders joined together at the centre in an L-shaped fashion by means of a conical stand or support, both of which cylinders or retorts are removable from the stand, which latter is firmly attached to the box. In the horizontal copper cylinder there is placed the mixture for generating the oxygen gas, while through the upright one passes the gas generated. Attached to the posterior part of the upright cylinder, there is connected a somewhat smaller cylinder by means of a lateral tube at the top for the purpose of condensing any moisture which may be present in the oxygen-producing mixture (which liquid may be removed at a bottom orifice on removing a rubber cork), and also, to receive the powdered mixture in case it should be carried over mechanically from the horizontal tube by excessive heat. Were this not the case explosion might result.

After the gas is generated by heating the horizontal tube, it passes in succession through the lateral upright cylinder and then through two series of wash bottles. The first two contain a solution of sodium hydrate, 90 grains in ten fluidounces of distilled water. The third and fourth contain a solution of silver nitrate, 15 grains in ten fluidounces of distilled water. The last bottle is filled with absorbent cotton to dry the gas as it passes through it. After this, by means of rubber tubing, the dried gas passes into rubber bags of ten gallons capacity, closed by means of a vulcanite stopcock. When full the bag is disconnected. To use the gas, there comes a pint inhaling bottle, which is to be half filled with water prior to use. It is simply an ordinary wash bottle with rubber cork, tubes and tubing for connection with the mouth and the supply in bag.

The mixture for generating the gas is composed of powdered potassium chlorate, four pounds; manganese dioxide, one pound; and precipitated ferrous carbonate, sixty grains. Mix and triturate well in a wedgwood or porcelain mortar, avoiding force or severe con-

cussion. Sift several times through a moderately fine sieve, and dry in a moderately heated oven, leaving the door open. It is essential that pure potassium chlorate and manganese dioxide containing no organic matter, be used. For the former, the writer always uses the English brands, and for the latter the Russian. This manganese dioxide in addition to being purer than that usually found in commerce, presents the added advantages of being more "grainy" in character, and less liable to fill up the condensing chamber. As to the utility of precipitated ferrous carbonate in the mixture, that is an open question. It is claimed that it absorbs any free chlorine gas generated, converting it into ferric chloride. In the absence of preservative agents, however, ferrous carbonate is rapidly changed into ferric carbonate on exposure to air, and it is most probable that after drying this change ensues; so in the making of the generating mixture the writer has left out that compound, and his results have been all that could be desired.

To generate the gas, heat the horizontal cylinder or retort, at the end attached to the central support, and when the gas from the material directly over it is exhausted, move the lamp or burner an inch or so towards the other end of the retort. Continue until the quantity of gas desired is obtained. The rapidity of evolution of gas may be gauged by the bubbling of gas through the wash bottles; when the cylinder is exhausted the bubbling will abruptly cease. A freshly filled cylinder must be used each time the gas is generated. If the contents of one cylinder do not yield sufficient gas, a second one must be used. After applying the heat, promptly remove the rubber cork from the bottom of the posterior upright tube or condenser, or there may be sufficient back-pressure from partial vacuum to cause trouble.

When from use the absorbent cotton in the fifth, or drying bottle becomes saturated with moisture, it should be removed and replaced with dry. The retorts are cleaned with hot water, and thoroughly dried before being used again. In filling the retorts care must be taken to prevent any form of organic matter, such as paper, wood or cotton fibre, from mixing with the material; otherwise an explosion by oxidation may result. Renew the solutions in the wash bottles as often as they become decomposed. No fixed rule can be given; but, in general, if pure chemicals be used, after 300 to 500 gallons of gas have been generated. The gas generated can be retained in

the rubber bag for some time, but the fresh gas is the more active. On keeping, more or less loss of gas, by transudation through the rubber bag, occurs.

In certain emergency cases, such as asphyxia, membranous croup, diphtheria, chloroform or ether narcosis, the freshly made gas is stated to be far superior to the gas which has been kept on hand. It is seldom necessary to use the oxygen of full strength, and there should be an interval of from one to three minutes between inspirations. To dilute the gas, first fill the rubber bag half full with air by means of a hand-bellows. Generally, fifty per cent. oxygen is as strong as it is advisable to exhibit, although at the Philadelphia Hospital, the full strength is always used. The exceptions to this rule are to be found in asphyxia, cyanosis, diphtheria and other critical emergencies. The gas should be inhaled slowly and deeply, never in a rapid or nervous manner.

CONVENIENCES IN THE PHARMACY.

BY CLEMENT B. LOWE, M.D.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Dec. 15.

It is no uncommon thing in these modern days to see pharmacies that are beautiful with silver, plate-glass and polished wood, but often the proprietor spends so much on mere modern adornment as not to feel like buying many things which are not only of the greatest convenience, but are almost indispensable. I have in mind a store once owned by an excellent pharmacist (theoretically) which, though quite deficient in appliances and conveniences, was further ornamented by the proprietor purchasing, on his visit to New York, an angel of cast iron and heroic size, to be placed in front of his establishment.

I do not propose in this brief paper to draw your attention to all of the conveniences which should be a part of every well-equipped pharmacy; for to do that I should have to write a book, and have we not already Remington's Pharmacy? I simply desire to draw your attention to a few of the conveniences which have been helpful to me.

The first one is *indexing* or *cataloguing* the store. For years, like most pharmacists, I got along without it, but since doing so, I have found it of the greatest convenience, although previously having the bottles and drawers alphabetically arranged. My shelv-

ing is divided into sections, like that of most other stores. On the cornice over each section is cemented a one-inch porcelain letter, which is large enough to be seen distinctly, and yet is not unpleasantly obtrusive. The first section is called A, the second B, and so on, the shelves being numbered from above downwards. Any closet in a section is designated by the letter C; if there is a lower one by the letters C C. For cataloguing I use Nelson's price-list, although any full one would do as well. If a new clerk (temporarily in charge) should wish to find pomade vaseline, he turns to the price-list, finds the name, and following it sees Sect. B, C, S. 2, which means section B, closet, shelf 2. The index is of great use in finding articles which are but seldom called for, which I hardly know whether in stock or where placed.

A convenient arrangement is the keeping of the drugs which are to be sold by weight, in the front part of the store, handy to the scales, and the liquids in the rear convenient to the prescription counter; also to have duplicates of nearly all powdered drugs upon the prescription counter. Upon the bottles containing those potassium salts most frequently dispensed, I have large capital letters pasted, which catch the eye at once, viz: A for the acetate, B for the bromide, C for the chlorate, I for the iodide and N for the nitrate.

By the *pill tile*, which is imbedded in a slide at the end of the prescription counter, I have a row of small bottles with sprinkler tops, containing powd. licorice root, powd. gum arabic, powd. gum tragacanth, lycopodium and rice flour; also small jars containing glycerite of starch and glycerite of tragacanth, to be used as excipients.

It is hardly necessary to say that I keep *poisons* in a closet entirely distinct from the prescription counter; but I do not have a bell upon the doors, the ringing of which will announce to some timid customer that I am about putting a poison in their prescription.

The glass labels of my shelf-ware that contain preparations poisonous in small doses have a *black* background, the others a *white* one; the black label catches the eye at once and puts the dispenser on his guard.

Upon the inside of the glass doors of the poison closet, I have fastened minimum and maximum dose tables so as to be read from

the outside. It is arranged according to the classification of the U. S. Pharmacopœia, but is not confined to the articles in it. This convenience for quick and accurate dispensing is greatly appreciated by my clerks.

Another great convenience is the method of *filing prescriptions* by means of a Shannon binding case of special size, $7\frac{1}{2} \times 9\frac{1}{4}$ inches, each one holding about 750 prescriptions. It is cheap, does not take up much room when open upon the counter, and gives easy access to the prescriptions, any one of which can be readily taken from the file.

I also exhibit to you two *ointment tiles*, which consist of pieces of plate glass 12×12 , one painted black upon the back for mixing light-colored ointments upon, the other white for dark ointments, and each imbedded in a walnut slide. It would have made a neater finish if the wood had been painted instead of the glass.

I also call your attention to a *container for ointments* which are most largely used, such as cold cream. It holds about 2 pounds, resembles a small bucket, is made of heavy tin, and has a slot in the lid for the spatula, each can having its own spatula, which saves the time ordinarily spent in cleaning the spatula after using.

A convenience which I hope to have when provided by some enterprising manufacturer, will be a hard *rubber spatula* for mixing those ointments which act upon metal; horn spatulas are absorbent and soon warp.

Another convenience which, if "cleanliness is next to Godliness," should have been placed first, is an abundant supply of *hot water* which I obtain by utilizing the store heater. Three stout pieces of heavy iron pipe, about twelve inches long, are connected parallel with each other by short elbows and placed in the heater above the fire pot on one side; this is connected with a circulating boiler and gives all of the hot water needed in the laboratory, at the soda counter and in the prescription department, and has cost nothing for repairs for some eight years.

In the corner of the store adjoining the sink, and arranged to drain into it, I have a small counter covered with zinc, and overhead a part of it a hood connected with a flue running into the chimney, while gas is conveniently arranged for heating and lighting. Many minor operations which cause unpleasant odors or gases can be carried on in this place.

Other conveniences might be mentioned but perhaps those already brought to your attention are sufficient to show that the store in which the pharmacist spends the most of his life offers a wide range for inventive genius.

DISPENSING LIQUIDS IN CAPSULES.

BY C. CARROLL MEYER, PH.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Dec. 15.

In looking over the December number of the Alumni Report, I noticed among the Pharmaceutical Queries, one which was of special interest to me, viz: What is the best method of dispensing liquids in capsules? I have had considerable experience with this method of dispensing liquids, and while mine may not be the best method, it is a practical one that any pharmacist can adopt.

The appliances necessary are a minim measure, a pipette, a camel's-hair pencil, and an empty shallow straw or card-board box, a tooth-brush box for instance, to make a holder in which to place the capsules. First punch holes in the box, the exact size of the capsule to be used, from $\frac{1}{2}$ to 1 inch apart. If of a mechanical turn of mind the pharmacist can also utilize a segar box. If minims be ordered, drop in the capsule carefully from minim measure. If the prescription calls for drops use a pipette, being careful in all instances to get the liquid *inside* of the capsule and not on the outside. Then take the top or cover of the capsule, moisten this slightly inside with warm water using a camel's-hair pencil, place the cover or top on the filled capsule, roll slightly with top up between thumb and first finger for several seconds, press gently but firmly together. Place the capsule in the holder to dry and set the holder in a cool place until the joints are tight. In my experience I find that volatile oils, etc., work better if mixed with an equal quantity of a bland fixed oil, *i. e.*, refined cotton-seed oil, or the so-called olive oil.

Points to be observed: Care must be taken to keep the liquid from the outside of the capsules. If the liquid gets on the outside, throw the capsule away and take a new one. Measure the volumetric capacity of your capsules and always *use a capsule that holds an amount in slight excess* of that required. As far as possible, a minim measure should be used.

A SIMPLE METHOD FOR THE PRESERVATION OF SYRUP OF IODIDE OF IRON.

BY A. L. BECK, PH.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Dec. 15.

That the subject of syrup of ferrous iodide in a permanent form, or a method for its preservation under the varying conditions of dispensing, is an interesting one to our profession, is shown by our pharmacal literature ever since its virtues as a therapeutical agent have been recognized. Many have been the suggestions relative to improved formulas for making, and methods to prevent oxidation and the subsequent liberation of free iodine, in the officinal syrup.

Prof. Remington refers to the use of a layer of vegetable oil as a satisfactory way to exclude the action of the air, but the thorough cleansing of the bottles is the objection to its use. The addition of hypophosphorous acid, which is said to be the method adopted by most manufacturers to secure stability, is objectionable, if for no other reason, because it is an unauthorized addition. The method of the Pharmacopœia of preserving in small vials is satisfactory if the whole of the contents is to be dispensed, but if a portion remains in the vial, the conscientious pharmacist will certainly suffer loss.

It is the purpose of this paper to offer another simple method for preservation that the writer has used satisfactorily for more than a year, by the use of carbonic acid gas. The idea was suggested when assaying an iron ore, in which the ferrous sulphate is protected by carbon dioxide from oxidation by the air.

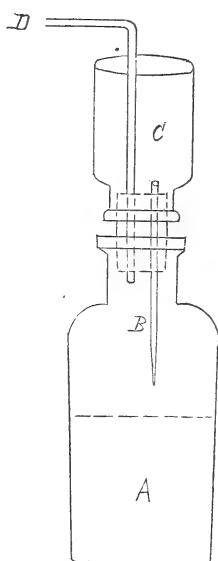
One thousand grammes of the syrup was prepared and put into two pint douche bottles, provided with pinch-cocks at the lower orifice, for drawing the syrup as required, and a rubber tube at the top supplied the CO₂ from an improvised generator, described elsewhere, and is shown by the illustrations exhibited with this paper. One of the bottles was securely corked and set away until needed.

On the first trial a slight tinge of iodine was developed on the top within the first twenty-four hours, but did not increase, and the bottle was used as required in dispensing without further change. In subsequent trials care was taken to allow considerable of the gas to flow over the syrup, and drive out all of the air, before corking tightly, with very satisfactory results.

No change is perceptible in the syrup from prolonged contact with the gas, the color and transparency remaining to the last.

Several methods for the automatic generation of the gas were tried, and the two simple pieces of apparatus shown by the photographs exhibited were found efficient.

A bottle of about the same size as the syrup bottle, and partly filled with dilute sulphuric acid, is connected through the cork by means of a siphon tube with a smaller bottle containing a concentrated solution of carbonate of sodium, and the gas is supplied to the well-corked syrup bottle by another tube fitted into the corks of



the acid and syrup bottles. When a portion of syrup is drawn, the partial vacuum formed in the bottles causes the solution of the carbonate to flow over into the acid, generating sufficient gas to replace the syrup drawn; the excess of gas, if any, escaping through the siphon tube and the carbonate solution. In another apparatus of more recent construction, the gas is kept under slight pressure by the weight of the liquid in the tube *B* and reservoir *C* as shown in the line diagram, which clearly shows its construction.

I find the specific gravity of the officinal syrup, very carefully made, and accurately tested, to be 1.429.

Sharon, Pa., Dec. 14, 1891.

IODINE: A NEW METHOD OF GIVING IT.

BY JOSEPH W. ENGLAND, PH.G.

That glucose possesses strong reducing qualities has long been known, and, assuming that if it was so strongly opposed to oxidation, it should serve to protect easily oxidizable substances from oxidation, the writer, in 1888, suggested the use of solid glucose for preserving syrup of ferrous iodide, and, later, the use of syrupy glucose for preserving syrup of hydriodic acid, and practice has borne out the truth that theory taught. Here are shown some samples of syrup of ferrous iodide made with glucose in 1888. You will observe that they still retain their normal green tint unimpaired. It is but fair to say, however, that equally as good preservative results have been obtained with hypophosphorous acid, in the quantity recommended by the National Formulary for solution of ferrous iodide.

Whilst glucose possesses such strong reducing qualities, who would have thought that it was capable of reducing the element iodine with the formation of colorless hydriodic acid, to a certain extent at least? A very interesting article upon the therapeutical application of iodine reduced in this way, appeared in a recent issue of the *Therapeutic Gazette*. The editor referred to the fact that full doses of iodine cannot be administered internally except in the form of potassium iodide, for the reason that free iodine in large doses is so irritating to mucous membranes. In order to secure the specific action of a remedy for chronic disorders, it is essential that it be retained in the circulating blood for a time sufficient to exercise its specific influence upon diseased tissues. It is claimed that in glucose there exists an agent capable of occluding free iodine, so that it becomes destitute of both odor or taste, and can be given in much larger doses than an equivalent quantity of free iodine, without producing any unpleasant symptom. Further than this, it is claimed that since glucose normally occurs in the intestinal juices, in the chyle after eating amylaceous and saccharine food, in the hepatic venous blood, and as glycogen in the liver, it is probable that glucose in occluding free iodine, is in itself protected from chemical change during the process of digestion by the anti-fermentative quality of the latter, and hence may be readily absorbed into the circulation, carrying in its embrace the iodine, to be liberated during the structural changes which ensue prior to the formation of

the new blood corpuscles. In the formula recommended, thirty grains of iodine are dissolved in four fluidounces of water, by means of one hundred and fifty grains of potassium iodide; to this solution there is added twelve fluidounces of golden syrup or sugar-house syrup, or molasses, all of which contain glucose together with some organic matter, and answer the purpose as well as the artificial glucose. Lastly, for flavoring, 120 minims of spirits of gaultheria are added. Dr. F. P. Mann in the *Medical Record*¹ writes that he has obtained the most satisfactory, even remarkable, results with this preparation, where potassium iodide or syrup of ferrous iodide have signally failed. He gives the syrup in tablespoonful doses, between each meal, with a little water. He advises that the freshly made preparation be kept for full twenty-four hours before being used, as from six to ten hours are required to completely occlude the free iodine.

NOTE BY THE EDITOR.—It is strange that it frequently takes a long time before an observation made in science may find practical application. More than 37 years ago the writer experimented with syrup of ferrous iodide, which had been decomposed by exposure and contained free iodine, and ascertained that it could be restored to its original properties simply by exposure to the direct sunlight (see *Amer. Jour. Phar.*, 1854, p. 409), but that the heat of the sun, its light being excluded, had no perceptible influence upon the colored syrup. For a number of years following the publication of the paper referred to, other investigations in the same direction were published, the most important paper having a bearing on the subject of Mr. England's paper being one by E. Fougere (*Amer. Jour. Phar.*, 1860, p. 22), in which it is reported that syrup of ferrous iodide becomes entirely unchangeable by a long exposure to heat or to the rays of the sun, and that iodine forms with sugar a chemical combination. Of the latter Mr. Fougere says (*ibid*, p. 25): "This new therapeutic agent, as white and as agreeable to the taste as the simple syrup, stable in its composition, no doubt will some day take the lead among the preparations of iodine." It will be seen from this that the method of giving iodine described as new by Mr. England, was actually suggested more than thirty years ago. The effects of iodine upon the sugars has been studied only to a

¹ *Medical Record*, June 13, 1891.

limited extent; but as early as 1833 Lassaigne observed (*Four. Chim. Méd.*, ix, 654) that on boiling iodine with solution of cane sugar, the mixture is decolorized with the formation of hydriodic acid. In 1845 Millon reported (*Compt. rend.* xxi, 828) that on warming iodine with a solution of grape sugar in the presence of potassium bicarbonate, iodoform is produced.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

A cheap red coloring matter for tooth-powder can be made from brazil wood. A decoction is made from 100–150 grams of the wood, and to this added 15–20 grams alum; the lake produced is sufficient to color one kilogram of tooth-powder.—*Rundschau*, 1891, 969.

Ink for writing upon glass or porcelain.—10 parts of bleached shellac and 5 parts Venetian turpentine are dissolved in 15 parts of oil of turpentine by immersing the containing vessel in warm water; after solution is effected, 5 parts of lamp-black are incorporated.—*Rundschau*, 1891, 970.

Iodoform-sponges—Fine sponges are first cleansed by boiling with water and then placed for five days in a 5 per cent. hydrochloric acid; after thorough washing and drying they are covered with a 7.5 per cent. ethereal solution of iodoform, and set aside until the ether has evaporated.—*Rittenheimer (Prag. med. Wochensch.)*, *Rundschau*, 1891, 970.

Detection of salicylic acid in salicyl-aldehyde and methyl salicylate.—In the course of an investigation of *Spiræa Ulmaria*, Dr. A. Schneegans and J. E. Geroch noticed that if the colored solutions which these substances form with ferric chloride be agitated with ether, the colorations due to salicyl-aldehyde and methyl salicylate were discharged, while that due to salicylic acid was not affected. In place of ether, chloroform, amyl-alcohol, acetic ether, carbon disulphide, petroleum ether, kerosene, paraffin oil, benzol, toluol, xylol and pure aceton can be used; if the coloration be obtained in alcoholic solution, diluting with the above-mentioned liquids will also discharge the color. If to 10 cc. of a solution, containing 0.020 salicyl-aldehyde, 2 cc. of a ferric chloride solution (the officinal solution diluted with 99 volumes water) be added, the violet coloration

is discharged by agitation with 5 cc. chloroform; if now 1 cc. of a solution containing 0.00002 salicylic acid be added, there remains, after agitation, a distinct coloration. This test is of practical importance in testing the artificial oil of wintergreen for free salicylic acid. If the oil be agitated with 500 parts water, and 10 cc. of this turbid mixture with 1 cc. of the diluted ferric chloride solution and 5 cc. chloroform be shaken together, a colorless mixture results if no free salicylic acid is present; if, however, 500 parts oil contain only 1 part free salicylic acid, there will be sufficient acid present in the 10 cc. of the mixture taken to produce a perceptible violet coloration if the vessel be held against a white background.—*Journ. der Pharm. v. Els.-Lothr.*, 1891, 285.

Calcium salicylate.—The following method of preparation gave very satisfactory results: 200 sodium salicylate are dissolved in 5,000 distilled water, the solution filtered and 10 solution of soda sp. g. 1.160 added; 100 pure calcium carbonate are decomposed with sufficient dilute acetic acid to form a clear and neutral solution, this is then diluted with 2,000 distilled water and added to the first solution; the precipitate is collected upon a filter, washed several times with cold distilled water and dried at a temperature not exceeding 35° C. The product forms a white, crystalline powder, odorless and tasteless, soluble in 2,000 parts cold water, more easily soluble in carbonated water and very readily soluble in acetic acid and the dilute mineral acids. It is used alone or with bismuth salicylate in diarrhoea, especially for children, also in gastro enteritis; dose 0.5 to 1.5 gram.—S. Torjescu, *Oesterr. Ztschr. f. Pharm.*, 1891, 629.

Test for Purity of Beeswax.—If a wax cylinder 3–4 cm. long and 5–6 mm. thick be placed in a test tube 8–10 cm. long and 1.2–1.4 cm. diameter and covered with petroleum-benzin so that there is a layer of liquid 1–2 cm. above the wax, the following behavior is noticed with pure beeswax. From the surface of the cylinder small pulverulent particles are loosened and after 1½ to 2 hours the quantity of wax taken will be found as a pulverulent deposit with an even surface; yellow wax may require three hours for this change, and the wax will be bleached although the supernatant liquid remains colorless or is only faintly yellow. Adulterated yellow wax generally retains the color, also coloring the benzin yellow; adulterated wax

cylinders will retain their form for a long time, i. e. as long as 2 to 4 days, and then will not fall into a powder but will split into longitudinal sections which may be straight or bent; if the adulteration amounts to only a few per cent., floccules may separate from the cylinder and after 12–24 hours the sediment will consist of floccules among which may be seen the longitudinal sections. The temperature for this test ranges from 14–18° C. (57–64·5° F.) All possible wax adulterants were examined by this test with very satisfactory results; it was also found that instead of the benzin, ether of specific gravity 0·720 could be used.—Dr. H. Hager (*Centr. Org. f. Waren-Kunde u. T.*) *Drogisten Ztg.*, 1891, 489.

The purification of tuberculin.—In the *Pharmaceutische Zeitung*, 1891, 741, Dr. Hoffmann gives results of several processes for the purification of tuberculin. The crude tuberculin (1 gm.) is slowly dropped into 20 gms. absolute alcohol and the white precipitate coagulated by addition of 0·1 gm. sodium chloride dissolved in 1 gm. water; after 24 hours it separates as a yellowish-brown resinous mass, which is rinsed three times with alcohol (99 per cent.) and then dissolved in 2 gms. water. This solution reprecipitated by addition of 40 gms. absolute alcohol and sufficient tartaric acid added to impart a slight acid reaction (all alkaloidal tartrates being soluble in alcohol, this procedure was adopted to remove alkaloids from the tuberculin); after 24 hours the clear supernatant liquid was decanted and the precipitate washed three times with alcohol; by dissolving in water and evaporating in a desiccator a white amorphous powder was obtained (9 per cent. of the tuberculin taken), which dissolved clear in water after adding a small quantity of sodium carbonate. This product marked A was compared with the purified product of Klebs B (*Am. Journ. Pharm.*, 1891, 599), also with the crude tuberculin C towards reagents. All three show the biuret test and are precipitated by picric acid and ferric acetate; C gives more decided precipitates than either A or B with phospho-molybdic acid, tannin and mercuric chloride; C gives precipitates not obtainable with A and B with potassium tri-iodide, platinic chloride and Mayer's reagent; with Millon's reagent A and B form whitish flakes becoming yellow on warming; C gives the same precipitate, and in addition a supernatant liquid that becomes cherry-red after warming. In all cases where differences were noticed between

the crude and purified tuberculin, the examination of the alcoholic mother-liquors disclosed the substance causing the difference.

Chloroform Pictet.—Experiments made to ascertain the action of direct sunlight on this article proved that in the absence of alcohol it did not change by exposure for three days; in the presence of alcohol (one per cent.) it withstood change for thirty days, although tested under most unfavorable conditions (exposure to the sun during June and July). An examination of the impurities removed in the manufacture of this chloroform (Am. Jour. Pharm. 1891, 346) is in progress. Comment has been made upon the practice of the manufacturer to add alcohol to this purified article, but this is to meet the requirements of the German Pharmacopœia; the alcohol used is also very carefully purified. The results obtained according to Dr. R. du Bois Reymond are very satisfactory.—Dr. Thilo, *Pharm. Centralhalle*, 1891, 657 and 663.

Thilandin is a preparation made by the action of sulphur upon lanolin; it is intended to replace thiol and ichthyol in dermal practice. It contains 3 per cent. sulphur and forms a brownish, unctuous mass having a sulphur odor. It is introduced by Jaffé and Darmstädter.—*Pharm. Centralhalle*, 1891, 678.

New medicinal soaps recommended by Eichhoff are: 1. Menthol-soap 5 per cent., useful in pruritus; 2. Salol-soap 5 per cent., useful in obstinate cases of eczema and psoriasis; 3. Aristol-soap 20 per cent., also serviceable in the above skin-diseases. All of these soaps should contain an excess of fat so as to prevent decomposition of the medicinal ingredients.—(*D. Med. Ztg.*) *Pharm. Centralhalle*, 1891, 679.

Estimation of alkaloids in extracts.—*Extract of Nux Vomica*: 2 gm. of the triturated extract are agitated with 5 cc. water of ammonia, 5 cc. water and 10 cc. alcohol until solution is effected; the solution is then shaken with three portions of chloroform, 20 cc., 10 cc and 10 cc. The united chloroform solutions are evaporated or the chloroform distilled off, the residue warmed upon a water-bath for several minutes with 15 cc. $\frac{n}{10}$ hydrochloric acid, then filtered and the filter thoroughly washed. The filtrate is titrated with $\frac{n}{100}$ alkali using cochineal as the indicator; if the number of cc. alkali be subtracted from 150 (corresponding to 15 cc. $\frac{n}{10}$ acid) and the remainder multiplied by 0.00364 (assuming that the alka-

loids are present in equal amounts) the product will represent total alkaloids present in 2 grams extract; multiplying this by fifty will give the percentage.

Extract of Belladonna, Aconite, Hyoscyamus, etc.—2.5 grams extract are dissolved in 3 cc. alcohol and 6 cc. water; the solution is rendered alkaline by addition of 1 cc. water of ammonia and then agitated with three portions of chloroform, 20 cc., 10 cc. and 10 cc.; after distilling off the chloroform, the residue is warmed upon a water-bath for a few minutes with 5 cc. $\frac{n}{10}$ hydrochloric acid, filtered, the filter washed with water, and the filtrate titrated with $\frac{n}{100}$ alkali (cochineal as indicator). By subtracting the number of cc. necessary to neutralize from 50 (corresponding to the 5 cc. acid) and multiplying the remainder by the following factors, the weight of alkaloid in 2.5 gm. is ascertained: for atropine and hyosciamine, 0.00289; for aconitine, 0.00533.

Extracts containing Chlorophyll.—5 gm. extract are dissolved in 50 cc. dilute alcohol, a slight excess of baryta water added, diluted to 150 cc.; after standing the supernatant liquid is filtered, the excess of baryta in the filtrate is precipitated by a current of carbon dioxide; after filtering, 75 cc. (representing 2.5 gm. extract) are evaporated to a syrupy consistence and dissolved in a mixture of 6 cc. water, 3 cc. alcohol and 1 cc. water of ammonia; the solution is extracted with three portions of chloroform, etc., as above.

Dry extracts containing powdered glycyrrhiza.—5 gm. extract are exhausted with 100 cc. diluted alcohol; to 80 cc. filtrate a slight excess of baryta water is added and diluted to 150 cc.; after clearing the supernatant liquid is filtered, the excessive baryta removed from the filtrate with carbon dioxide, again filtered and 75 cc. filtrate (representing 2.5 gm. extract) extracted with three portions of chloroform etc., as above.

It is claimed for these methods that all the alkaloid is extracted by the chloroform in the presence of alcohol, and that the emulsifying is avoided by the presence of the dilute alcohol.—Prof. H. Beckurts; Apoth. Ztg., 1891, 537.

Oil of cloves.—The value of this oil depending upon the quantity of eugenol present, H. Thoms proposes the following method of assay depending upon the formation of benzoyl-eugenol (see Am. Jour. Pharm., 1891, 406): 5 gms. of the oil, 20 gms. solution of

sodium hydrate (15 per cent.) and 6 gms. benzoyl chloride are placed in a tared beaker of 150 cc. capacity and thoroughly mixed, this causing the mixture to become quite hot; after cooling 50 cc. water are added, and heat applied until the crystalline mass melts, and again allow to become cold; the clear liquid is run through a weighed filter (dried at 101° C.), and the same operation of washing the crystals repeated twice with 50 cc. water. To remove the sesqui-terpene, which may contaminate the benzoyl-eugenol, the crystals have to be washed with alcohol; this is effected by adding to the still moist crystalline mass in the beaker 25 cc. alcohol of 90 per cent., warming until solution is effected, rotating the solution until the crystals begin to separate again, then allowing the contents of the beaker to cool to 17° C., transferring to the weighed filter and washing with a little 90 per cent. alcohol until the filtrate measures 25 cc; the filter with contents is then at once transferred to the beaker, dried at 101° C. and weighed. To the weight of the benzoyl-eugenol must be added 0.550 gm., the amount soluble in 25 cc. 90 per cent. alcohol; this weight, multiplied by 164 (the molecular weight of eugenol) and divided by 268 (the molecular weight of benzoyl-eugenol) gives the amount of eugenol in 5 gms. oil; for the percentage multiply again by twenty.

An examination of sixteen samples showed the eugenol to vary from 76.87 per cent. to 90.64 per cent.; the oil distilled from the stems was found (contrary to expectations) to contain a high percentage of eugenol, 83–85 per cent.; the specific gravity of the oil was not found to agree with the percentage of eugenol as the following show: $1.059 = 83.2$ per cent.; $1.065 = 80.89$ per cent.; $1.065 = 82.77$ per cent.; $1.0615 = 84.10$ per cent.; $1.0655 = 90.64$ per cent.; $1.061 = 81.18$; this led to the belief that there must be a third constituent present in the oil, for if there were only eugenol and sesquiterpene, the specific gravity should vary in accordance with the percentage of eugenol.—*Pharm. Centralhalle*, 1891, 589.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

Estimation of fats in Vaseline.—Messrs. Vizern and Nicolas (*Four. de Pharm. et de Chim.* 1891, II, 49) for this purpose use the following reagents: (1) Titrated sulphuric acid. (2) A solution

of potassium hydrate (from alcohol) 20 gm. in 100 cc. alcohol of 90 per cent. which has been volumetrically tested ($\cdot 1$ cc. = $\cdot 0047$ K_2O). (3) A solution of phenolphthalein 1 cg. in 500 cc. alcohol of 90 per cent. to which is added sufficient potassium hydrate to produce a slight rose color. The method of using is as follows: To 10 grams vaselin in a porcelain capsule are added 10 cc. of solution No. 2. The mixture is heated on a water-bath under constant stirring for eight minutes; then 50 cc. of No. 3 are added and heated close to the point of boiling. The titrated sulphuric acid is then added, drop by drop, until the mixture becomes colorless. The number of cc. of sulphuric acid used is subtracted from the number of cc. necessary to neutralize 10 cc. of the potassium hydrate solution and the difference multiplied by $\cdot 0047$ which gives the amount of K_2O used. The further calculation is by using the equation $n : x :: 1\cdot635 : 10$, where n represents the quantity of potash absorbed. The result is then multiplied by 10 which gives the percentage of impurities present. The number $1\cdot635$ (grams) represents the amount of K_2O necessary for decomposing 10 grams of the fats.

Analysis of Woman's Milk.—H. Wartha (*Ann. di Chim. e di Farmacol.* xiii, 1891, 179) analyzed the milk of 25 women, ranging in age from 18 to 40 years, with the following results:

	Mean.	Minimum.	Maximum.
Specific Gravity, . . .	1'03276	1'02903	2'03633
Fat,	33'5	10'00	48'90
Lactose,	70'05	3'20	75'70
Albuminoids,	17'96	12'60	22'30
Ash,	2'01	1'40	2'80
Water,	876'13	862'20	971'90

Pillcoating with Salol.—Dr. Ceppi recommends that pills, which should be disintegrated in the intestines, be coated with salol, as this is dissolved by the alkali which is always present there. Yvon (*Progrès médical*, Aug. 15, 1891), publishes the following formula for this coating: Salol, 2 gm., tannin, 5 dgm., ether of 50°, 10 gm. This is applied in the same manner as the coating with balsam of tolu.

Antisepsis of the Intestinal Canal.—Dujardin-Beaumetz (*Nouveaux Remèdes*, 1891, 497), uses the following for this purpose: Salol, bismuth salicylate, sodium bicarbonate of each, 10 gm., to be divided into 30 cachets, and one to be taken before breakfast and dinner.

Salol.—E. Egasse (*Bullet. de Thérapeut.*, 1891, II, 313), in the course of an article on salol gives the following formulas for the exhibition of this agent :

In suspension for children. Salol, ad libitum; gum arabic, 5 gm. ; gum tragacanth, 20 gm. ; simple syrup, 30 gm. ; water, 120 gm. *For intestinal antiseptis* in typhoid fever and in rectal cancer : Salol, 10 parts ; olive oil and lime water, of each 60 parts. *For burns* : Potassium carbonate, 1 gm. ; olive oil, 10 gm. ; zinc oxide and starch, of each 15 gm. ; sulphur, 6 gm. ; salol, 5 gm. ; lanolin, 63 gm. *For contagious impetigo, pustular eczema* : Salol, 3 gm. ; ether, 3 gm. ; cocaine hydrochloride, 20 cgm. ; collodion, 20 gm. *For sore nipples* : Salol, 4 gm. ; ether, 4 gm. ; collodion, 30 gm. ; or in the form of powder, powdered salol and starch equal parts ; as ointment, powdered salol, 5 gm ; lanolin or vaselin, 30 gm ; *Absorbent cotton* may be saturated with an ethereal solution of salol.

Solution of Salicylic Acid.—Barnouvin (*Rev. de Thérap.*, 1891, 580) draws attention to the fact that glycerin is a good solvent of salicylic acid. By heating, glycerin is able to bring into solution $\frac{1}{50}$ of its weight of the acid, the acid not being deposited on cooling. In endeavoring to obtain a more concentrated solution he found that separation takes place on cooling. A glycerin solution of salicylic acid (1 : 100) will stand dilution with water without precipitation. (See *Amer. Jour. Phar.*, 1890, 18, 17.)

Glycerin as dressing for wounds.—J. J. Fiodoroff (*Med. Obozr.*; *Rev. de Thérap.*, 1891), uses glycerin in place of iodoform in dressing wounds and tabulates the reasons for his preference as follows : (1) glycerin produces in external application no disagreeable secondary effects, whether local or general. (2) In suppurating wounds, it diminishes the suppuration, cleanses the granulations, prevents the morbid processes and accelerates the formation of the cicatrix. (3) It acts like a protective layer in cases where mucous membranes have been destroyed. (4) The walls of purulent cavities, under the influence of glycerin, are rapidly altered, healthy granulations making their appearance.

The estimation of phenol, by means of nitric acid, is recommended by L. Carré (*Comp. rend.*, cxiii, 289). Phenol is thereby converted into picric acid, and the amount of the latter is determined by the

intensity of the coloration through comparison with solutions of known strength.

The generation of oxygen by plants has been studied by Henri Jumelle (*Compt. rend.*, cxii, 1462) at very low temperatures and he found that carbonic acid is decomposed at low temperatures, at which respiration has completely ceased, by plants the vitality of which is not affected by a high degree of cold. Thus the assimilation of atmospheric carbonic acid gas is effected in the light at -35° and -40° C. by *Picea*, *Juniperus* and other coniferæ, and by lichens like *Evernia Prunastri*.

Compounds of camphor with aldehydes.—A. Haller has found the following process to yield good results (*Compt. rend.*, ciii, 22): Dissolve 15 gm. sodium in a solution of 150 gm. camphor and 400 gm. toluol, allow to cool, pour off the liquid, wash the crystals of sodium camphor with a little benzol, and then heat with 100 gm. toluol and 105 gm. benzaldehyde; after washing with water the oily liquid contains toluol, camphor, borneol, borneol benzoate and *benzal camphor* (dextro); the latter melts at 95° C. Lævocamphor yields lævo-benzalcamphor having identical properties except in behavior to polarized light. A mixture of equal parts of the two is inactive and melts at 78° C. Analogous crystalline compounds have been obtained as follows: *Cuminalcamphor* $C_{20}H_{26}O$, melting point, 62° ; *methylsalicylcamphor*, m. p. 93° ; *ethylsalicylcamphor*, m. p. 65° ; *cinnamalcamphor* $C_{19}H_{22}O$, boils at 280 to 290° C.

Reaction of oil of turpentine with manganous salts—Commercial oil of turpentine, on being agitated with an ammoniacal solution of a manganous salt, acquires a blackish brown color; the reaction is facilitated by the application of heat. L. Crismer (*Bull. Soc. chim.* [3] vi, 25) ascertained that this reaction depends not only upon the presence of hydrogen dioxide, but likewise of a small quantity of a water-insoluble acid, which was produced by the prolonged influence of air upon the oil. The same reaction takes place with pure oil of turpentine, by adding to it a little oleic acid, followed by the manganous solution, and agitating the mixture with air. *Oil of lemon* shows a similar behavior. On distilling the brown oil in vacuo, a resinous residue is left, soluble in chloroform and containing manganese and formic acid, the latter apparently produced by the oxidation of the terpene. This behavior may be used for the detection of oil of turpentine in various mixtures.

ARTIFICIAL MUSK.¹

BY A. BAUR.

The artificial musk previously described (Am. Jour. Phar., 1890, 489) was regarded as trinitroisobutyltoluene. It is, however, a derivative, not of isoprimary but of tertiary butyltoluene, owing to the occurrence in the preparation of the hydrocarbon of an intramolecular change, corresponding with that observed by Schramm in the case of the condensation of benzene with isobutyl bromide by the Friedel-Crafts method.

Tertiary butyltoluene is easily obtained by the action of tertiary butyl chloride on toluene in the presence of aluminium chloride. It boils at 185–187°, and agrees in properties with the so-called isobutyltoluene. The *sulphonic acid*, prepared by warming it with concentrated sulphuric acid, forms a *barium* salt $(C_{11}H_{15}SO_3)_2Ba + H_2O$, which crystallizes in white scales, and dissolves sparingly in cold water, but more easily in hot water, and in 50–60 per cent. alcohol. The *sulphonamide*, $C_{11}H_{15} \cdot SO_2NH_2$, crystallizes from water in nacreous scales, and melts at 94–95°. Earlier determinations with the sulphonamide prepared from so-called isobutyltoluene gave 74–75° as the melting point, and this value is always obtained with the freshly-prepared substance; after being kept for some hours, the melting point is found to have risen to and remains constant at 94–95°. The trinitrobutyltoluene formed by the nitration of tertiary butyltoluene melts at 96–97°, and is identical with the product from so-called isobutyltoluene.

Nitrobutyltoluene, $CMe_3 \cdot C_6H_3Me \cdot NO_2$, is obtained by slowly adding fuming nitric acid to a solution of tertiary butyltoluene in acetic acid. It is a yellowish oil of a peculiar and slightly unpleasant odor, boils at 160–162° in a vacuum without decomposition, and is readily volatile with steam. On treatment with excess of nitric acid, it is converted into artificial musk.

Dinitrobutyltoluene, $CMe_3 \cdot C_6H_2Me(NO_2)_2$, is formed, together with the mononitro- and trinitro-derivatives when tertiary butyltoluene is dissolved in well-cooled nitric acid of sp. gr. 1.5. On distillation with steam, the mononitro-derivative passes over first, and then a mixture of the mononitro- and dinitro-derivatives distils over, leaving a residue of the trinitro-derivative mixed with a very small

¹ Reprinted from Jour. Chem. Soc., 1891, 1464 (*Ber.*, **24**, 2832–2843).

quantity of the dinitro-compound. A separation of the dinitrobutyltoluene can be more easily effected by crystallizing out the greater part of the trinitrobutyltoluene, repeatedly distilling the oil in a vacuum, and collecting the fraction boiling at 224–225°. Dinitrobutyltoluene is a brown oil of very unpleasant odor, and does not solidify in a freezing mixture. On further nitration, it is converted into artificial musk.

Trinitrobutyltoluene (artificial musk), $\text{CMe}_3 \cdot \text{C}_6\text{HMe}(\text{NO}_2)_3$, is obtained when tertiary butyltoluene is slowly added in the cold to five times its weight of a mixture of 1 part of nitric acid (sp. gr. = 1.5) and 2 parts of 15 per cent. anhydrosulphuric acid, and the mixture afterwards heated for 8–9 hours on a water-bath. It crystallizes from alcohol in yellowish-white needles, melts at 96–97°, is only very slightly volatile with steam, and has a powerful odor of musk. It is insoluble in water, but it dissolves readily in alcohol, ether, benzene, chloroform, and light petroleum. With naphthalene in alcoholic solution, it forms a compound $2\text{C}_{11}\text{H}_{13}(\text{NO}_2)_3\text{C}_{10}\text{H}_8$, which crystallizes in large, yellowish scales, melts at 89–90°, and decomposes into its generators on warming with water. Trinitrobutyltoluene is not affected by treatment with alkalis or ammonia, and when warmed with an excess of aniline forms a compound $3\text{C}_{11}\text{H}_{13}(\text{NO}_2)_3 2\text{NH}_2\text{Ph}$, which crystallizes from the excess of aniline in compact forms, and melts at 64°. Of the four possible formulæ for a trinitrometabutyltoluene, the author, on these grounds, excludes the three containing two nitro-radicles relatively in the ortho-position, and assigns to artificial musk the remaining formula $[\text{Me} : \text{CMe}_3 : (\text{NO}_2)_3 = 1 : 3 : 2 : 4 : 6]$.

Amidobutyltoluene, $\text{CMe}_3 \cdot \text{C}_6\text{H}_3\text{Me} \cdot \text{NH}_2$, is formed by the reduction of nitrobutyltoluene with tin and hydrochloric acid. It is a colorless oil, of pleasant, cumin-like odor, and boils at 245°. The acetyl derivative, $\text{C}_{11}\text{H}_{15} \cdot \text{NHAc}$, crystallizes from alcohol in lustrous scales melting at 162°, and the benzoyl derivative in small, white needles melting at 167–168°. It is therefore identical with the amido-compound obtained by Effront in 1884, by heating isobutyl alcohol with orthotoluidine hydrochloride at 280–300°, and must contain the amidogen in the para-position relatively to the tertiary butyl radicle.

Amidodinitrobutyltoluene, $\text{CMe}_3 \cdot \text{C}_6\text{HMe}(\text{NO}_2)_2 \cdot \text{NH}_2$, is obtained when trinitrobutyltoluene in alcoholic solution is reduced with the

theoretical quantity of ammonium sulphide. It crystallizes from alcohol in brownish-yellow needles, melts at 125–126°, and is insoluble in water. The *hydrochloride* crystallizes in brown scales, and on treatment in alcoholic solution with ethyl nitrite, gives a *dinitro-butyltoluene*, which could not be crystallized.

Tertiary butylmetaxylene, $C_6H_3Me_2 \cdot CMe_3$ [$Me_2 : CMe_3 = 1 : 3 : 5$], can be prepared by boiling metaxylene either with isobutyl bromide or tertiary butyl bromide in the presence of aluminium chloride. It is a colorless liquid which boils at 200–202° under 747 mm. pressure, and on oxidation with nitric acid, yields mesitylenic acid, and with chromic acid, trimesic acid. The *trinitro*-derivative, $CMe_3 \cdot C_6Me_2(NO_2)_3$, crystallizes from alcohol in yellowish-white needles, melts at 110°, and has a strong, musk-like odor; the *nitro*-derivative, $CMe_3 \cdot C_6H_2Me_2 \cdot NO_2$, formed by adding fuming nitric acid to a cold acetic acid solution of the hydrocarbon, crystallizes from alcohol in white needles which melt at 85°, and have a cinnamon-like odor.

Butylethylbenzene, $C_6H_4Et \cdot CMe_3$, is formed by the condensation of ethylbenzene and isobutyl bromide in the presence of aluminium chloride, and is separated from the butyltoluene and butylbenzene produced in the reaction by fractional distillation at 200–205°. It resembles butyltoluene in properties, and yields a *trinitro*-derivative, $CMe_3 \cdot C_6HEt(NO_2)_3$, which is more soluble in alcohol than artificial musk, and has a strong musk-like odor.

Among the secondary products of the reaction between pure toluene and pure isobutyl bromide in the presence of aluminium chloride, are butylbenzene, butylxylene, butylethylbenzene, dibutylbenzene, and dibutyltoluene, and these substances are present in the fraction 170–200°, which was formerly used instead of pure tertiary butyltoluene in the preparation of artificial musk.

AFRICAN COPAIBA "SO-CALLED."

By JOHN C. UMNEY, PH.C.

During the present year two consignments at least of a copai-erous (?) oleo-resin have been exported by the Niger Company from West Africa to the port of London, the produce, it is said, of the district of the Niger basin. The substance has been offered on several occasions as Balsam Copaiba without finding a bidder or purchaser at public auction. The appearance of such an import is interesting, inasmuch as several species of *Copaifera* are known to

be indigenous to tropical Africa,¹ but the information as to the production of oleo-resins by these species is very meagre, the only description of a secretion of economic value being given by Bennett, who describes *Copaifera Guibourtiana*, known by the natives as the "Kobo" tree, as yielding a copal.

Of the closely allied genus *Hardwickia*, the oleo-resin of certain species of which resembles that of the *Copaifera*, as far as I can learn only one African variety is known, viz: *Hardwickia Mannii*,² and it is doubted whether even this is not a species of *Copaifera*.

With such scanty botanical information available, and the exact district of their production at present unascertained, it appeared desirable to compare these African oleo-resins with the products of the South American species of *Copaifera*, with the object of determining their relationship or otherwise by physical and chemical characteristics.

The two oleo-resins from West Africa, which I will designate as (A) and (B), were dissimilar in appearance, due probably to a difference in the manipulation of the two samples.

(A) was light brown in color, slightly fluorescent, having an aromatic, somewhat piperaceous odor, a specific gravity of 0.987 at 15° C., and on standing, deposited a quantity of small crystals. It yielded by distillation with steam 37.9 per cent. of a pale yellow essential oil, which, when dried over chloride of calcium distilled at 264–270° C., and had a specific gravity of 0.9173 at 15° C. The oil was readily soluble in petroleum ether and ether (0.735), less soluble in pure ether (0.720), and only slightly soluble in rectified spirit and glacial acetic acid. The crystals deposited by the oleo-resin were repeatedly crystallized from petroleum ether, and when pure, had a melting point of 124° C. (uncorrected), had a faint yellow color and were distinctly acid in reaction.

(B) was darker in color, more markedly fluorescent, possessed an aromatic, piperaceous, but slightly empyreumatic smell, and on standing, nearly half its bulk separated as an ill-defined crystalline mass. The specific gravity of the oleo-resin, thoroughly mixed, was 1.002 at 15° C.; but after removal of the deposited mass, the fluid

¹ "Pharmacographia" (1874), p. 200; Bentham and Hooker, vol. i, p. 585; De Candolle's "Prodromus," vol. ii, p. 509; Oliver, "Flora of Tropical Africa," vol. ii, p. 313.

² Oliver, "Flora of Tropical Africa," vol. ii, p. 316.

portion had a specific gravity of 0.992 at 15° C. It yielded by distillation with steam 40.2 per cent. of a pale yellow essential oil, boiling from 264–270° C. (uncorrected) and having a specific gravity of 0.9188 at 15° C. The oil was readily soluble in petroleum ether and ether (.735), less soluble in pure ether (.720), and only slightly soluble in rectified spirit and glacial acetic acid.

The crystals were purified in the same manner as those from (A) and found to have the same melting point (124° C.), and to be distinctly acid. This melting point is somewhat close to that of a crystalline resin obtained by Flückiger¹ from gurjun balsam (m. p. 126–130° C.), but that body was indifferent, whilst this from the African oleo-resin is markedly acid, distinctly electrical by friction, and appears to resemble in general characters the oxycopaivic acid (melting point about 120° C.) found by Fehling² in a deposit from a Para copaiba. From neither of the oils—of specimens (A) and (B)—could crystals be obtained by passing dry hydrochloric acid gas through them, either at normal temperature or immersed in a freezing mixture, as has been stated to be the case by Soubeiran and Capitaine³ with Maracaibo oil under similar treatment, but they gave reddish-brown fuming liquids, agreeing with the behavior of an oil distilled from Para copaiba by those authors.

I have failed, notwithstanding several attempts, to obtain crystals of a hydrochloride by this method, when operating on the oil obtained from the Maracaibo variety, and in this respect, therefore, my experiments confirm those of Brix,⁴ and show that the formation of this crystalline body from pure copaiba oil appears somewhat uncertain.

A ready test proposed by Flückiger,⁵ for distinguishing between copaiba and gurjun balsams, and which has been made official in the United States Pharmacopœia, consists in adding to a solution of the balsam in carbon bisulphide a drop of nitric and sulphuric acids previously mixed and cooled, when in the case of gurjun balsam an intense violet color is produced.

On applying this test to samples (A) and (B), in comparison with

¹ *Pharm. Journ.* [3], viii, 725.

² *Ann. Ch. Pharm.*; xl, 110.

³ *Journ. Pharm.*, xxvi, 70.

⁴ *Monatshefte*, [2], p. 507.

⁵ *Pharm. Journ.* [3], vii, p. 2.

specimens of Maracaibo and Para copaiba, a brownish-red coloration was produced. A sample of gurjun balsam, however, gave a decided and permanent violet.

Neither of the two oleo-resins (A) and (B) lost their fluidity when heated in a sealed tube to 220° C., whilst gurjun balsam similarly treated became quite solid.

That the two African oleo-resins are identical, therefore, admits of little doubt, and their general characteristics resemble in most particulars the South American copaibas, the only commercial varieties with which we have been previously acquainted.

I hope shortly to publish the results of a chemical examination of the crystals and volatile oils obtained from the two African oleo-resins.—*Pharm. Jour. and Trans.*, Dec. 5, 1891, p. 450.

CAMPBOR: METHODS OF GROWTH AND MANUFACTURE IN FORMOSA.

BY EDWARD BEDLOE.

[Correspondence of the *Public Ledger*, Nov. 17, 1891.]

The most interesting portion of my district of "Amoy and its dependencies," to use the diplomatic phrase, is the great island of Formosa. The name (the Portuguese adjective for beautiful) is extremely appropriate, for I question if any handsomer or more picturesque scenery can be found upon the globe. The territory is over 200 miles long and 60 wide, and is about as large as England, Scotland and Wales combined. Along its major axis runs a double range of magnificent mountains, several of whose summits are constantly covered with snow. The fertility of the soil is proverbial in the East. At some points the land produces from three to five harvests a year. Besides the best tea in the market, it produces unlimited quantities of camphor, sugar, rice, hemp, oil, oil cake, castor oil, turmeric and valuable woods. It ought to have an immense commerce with every part of the world, but it has not, which is due to the time-beaten prejudice of its governing classes against foreigners and everything foreign.

Nowhere does the force of this blind prejudice show itself in so large and ruinous an extent as with the trade in camphor and camphor wood. From the earliest times camphor has been a practical necessity to man. Its pleasant perfume, its destructiveness to

insect life and its many remarkable therapeutic virtues have more than earned its great popularity.

In the past twenty years its importance has been multiplied many times by the discovery of celluloid, zylonite and smokeless powders, in all of which it is an essential ingredient. While the camphor tree grows in numberless places, it finds its best development in Japan, and, above all, in Formosa. In the last-named place it is the predominant forest growth. The trees upon the island are to be numbered, not by hundreds of thousands, but by millions. At the present time there is enough camphor in Formosa to supply all Christendom for a century. Yet, notwithstanding these facts, the output of the entire island in 1890 was only about 60 tons!

The camphor expert selects a tree, and scrapes into the trunk in different places, using an instrument resembling somewhat in appearance a rake, with teeth of curved, gouge-shaped edges that cut pulling. This scoops out the wood in little crescent-shaped chips. A tree is not considered to be worth anything for camphor purposes until it is 50 years old. The yield of a tree is unequal, being greater in and about the roots than higher up on the trunk.

The scrapings or chips are pounded in a stone or iron mortar and boiled in a large iron caldron, over which is placed, with the concave side covering the mouth of the caldron, an earthenware bowl-shaped vessel. In the boiling the camphor sublimes and condenses on the inside of the big bowl, which is removed from time to time, the camphor scraped off and replaced.

The root and trunk are scraped while the yield lasts, and the chipping is continued till finally the tree falls. No attempt is made to extract the camphor from the trunk or branches of the fallen tree. In some cases the trunk is sawed up into planks, but this depends upon the locality. In many districts, owing to absence of roads, timber would not pay for its transport. It is impossible to imagine a more wasteful method, and it is fortunate that the camphor forests of Formosa are practically inexhaustible. The quantity of camphor produced depends upon the amount of labor employed in the business. Ten iron pots and accompanying bowls make up what is called a "set," and are worked by four men. One set will produce about six pounds a day; a fair average is 150 pounds a month.

At one time the camphor trade was monopolized by the Governor

of Formosa and his official staff. The annual output ran as high as 250 and 300 tons and netted the distinguished syndicate over \$100,000 a year. The profit can be easily appreciated when it is known that the poor peasant was paid four cents per pound for the camphor which was sold a week afterwards in Hong Kong for anywhere from 24 to 35 cents. The monopoly was abolished in 1870 at the intervention of the ministers of all the great powers at Peking. Foreign merchants, especially British and American, prepared to enter the trade on a large scale. The authorities, with characteristic shrewdness, enacted forthwith a *likin* or internal revenue system which completely frustrated all attempts to do business successfully.

(1) A tax was imposed upon every pot or boiler, no matter whether used full time, half time, or no time at all. As non-payment of a tax in China is a crime punishable by fine and imprisonment, this measure caused the camphor makers to break and destroy one-half of their plant rather than run the risk of going to jail.

(2) A heavy "battery tax" (or an assessment for the building and maintaining of forts in the district) was imposed upon the finished product. This was nominally about three cents per pound, but as levied came to twice that figure.

(3) The barrier imposts (or *likin* proper) were assessed at from one to two cents a pound upon the article. In instances a donkey load of camphor would be obliged to pass six to a dozen barriers between the point of production and the market place.

(4) An export duty was laid upon the camphor.

(5) A system of terrorization was set on foot by the subordinate officials, which frightened nearly all the camphor growers from selling to the foreign hongs. Under these circumstances the trade languished, and the supply demanded by Europe and America was drawn from Japan and other countries.

In 1885-86 there was a change in the administration of Formosa and a more liberal and progressive set of men came into office. They began their régime with promise of reform, of new laws for the extension and benefit of trade, and of a more generous and equitable treatment of the foreign hongs. The latter were delighted and made contracts with the native merchants and farmers for large quantities, to be delivered at the place of production and to be brought down to the port under the protection of official permits.

The first consignment arrived promptly and cleared a very handsome profit. The merchants were delighted, but their pleasure was short-lived, inasmuch as the new Governor, without a word of warning, re-established the old monopoly. Notwithstanding the contracts then pending between the foreign merchants and the native dealers, contracts upon which large sums had been advanced, the internal revenue and custom house officers seized all the camphor in the market or in transit, permits or no permits. The merchants were thunderstruck and appealed in a body to the British and United States Consular representative at Talwanfoo, Hon. Pelham L. Warren, a brave and brainy gentleman. He made a strong fight against the outrage, put in claims for heavy damages, carried the case to Peking, where he was sustained by the united foreign legations, and afterwards by the highest authority in China, the Jsung-li-Yamen or Imperial Cabinet. The monopoly was expressly abolished, and the claims after tedious delay and litigation, allowed and paid in full to the sufferers.

Before the opportunity thus created could be taken advantage of, the local administration levied a special tax on camphor of one cent per pound, exclusive of the internal revenue and export duty. It was done under the pretext of a "garrison tax," the Government claiming there was danger of an uprising of the savages in the interior of Formosa, and that new regiments had to be raised, equipped and supported. There never was any uprising, there were no troops recruited, but the tax ran gayly along all the same, and the proceeds went into the pockets of those in power. The tax was then raised to two cents per pound as the price of camphor rose in the Hong Kong market, and as this did not change the state of affairs it was again raised, this time to 13 cents per pound. At the same time the camphor growers were warned by threatening proclamations that they were required to pay this tax in advance upon all camphor produced; that any delinquency or mistake would meet with the severest punishment, but that the "camphor farm" (a new form of the old Government monopoly) would pay eight cents a pound to any and all growers for their crop. Up to the time of these last enactments the price of camphor had fluctuated in the country where it is grown from four cents to eight cents a pound. It now rose with a jump to 21 cents. The net return to the buyer was about five cents on an average; the difference went

to the "camphor farm;" that is to say, about one-tenth thereof to the members of the official clique and nine-tenths to the superior officials of Formosa.

This monstrous condition of affairs has remained unchanged up to date. The producers are afraid to deal with the foreign merchants lest they be fined and imprisoned for some technical violation of the law. The merchants are fearful of making contracts which will cause litigation and loss at the hands of the internal revenue and the customs. The trade has, therefore, been steadily falling off, and as the smokeless powders of Europe, made from camphor, have proved to be failures, and are being replaced by explosives in which that substance is not employed, the demand is diminishing from abroad, so that there is every prospect of an utter collapse of the camphor trade and the camphor monopoly of Formosa.

The monopoly is singularly devoid of intelligence. The Chinese never dare to go into the interior, where the savages live, and where the finest camphor can be had at almost no expense.

The savages, strange to say, have a wild love for Europeans or white people, probably because of their hatred for their Chinese enemies, and are willing to supply any amount of camphor on demand. The monopoly, to prevent this source of competition, have had a law passed prohibiting all intercourse or commerce with the aborigines, and even forbidding the tourist to enter the latter's territory. There is at present some prospect of a speedy change. The old Governor has just been removed and a new one is to be appointed. In view of the serious troubles in China, which are forcing the Central Government into more intimate if not more amicable relations with the foreign powers, it is more than probable that the coming appointee will inaugurate a wiser and better policy than that which has prevailed in Formosa during the past five years. If such an event occur there will be a wonderful development in the commerce of that wonderful island. If not, it will sink deeper in the ocean of bankruptcy and pauperism.

AMOY, October 4, 1891.

Aseptic scrubbing brush.—Prof. J. B. Roberts recommends the Egyptian *luffa* for the removal of accumulations of epithelium and bacteria from the skin previous to operation. A piece of the fibrous tissue is used and may then be thrown away; for hospital use such pieces may be kept soaking in sublimate solution until used.—*Med. News*, Nov. 7, 1891, p. 544.

STRYCHNINE.¹

BY J. TAFEL.

Investigation has shown that the compound named "strychnol" by Loebisch and Schoop (Am. Jour. Ph., 1888, 564), and previously described by the author as strychnine monhydroxide (1890), is not a phenol, but an imido-acid of the composition $C_{20}H_{22}NO(COOH):NH_4H_2O$; so that it may suitably be named *strychnic acid*. The substance, of the composition $C_{21}H_{26}N_2O_4$, obtained by Gal and Etard (*Bull. Soc. Chim.*, **31**, 98) by heating strychnine with a solution of barium hydroxide at 130° , and named by them dihydrostrychnine, loses 1 mol. H_2O at 135° , and has, therefore, the composition $C_{21}H_{24}N_2O_3 + H_2O$; as it is isomeric with strychnic acid, and, also, gives almost all the reactions of the latter, it may be termed *isostrychnic acid*. Both these acids are formed when strychnine is treated with alcoholic soda at 100° or with barium hydroxide at 140° , but the relative quantity of the two compounds depends, to a very considerable extent, on the temperature at which the reaction is carried out; when, for example, finely-divided strychnine (10 parts) is heated at $50-55^\circ$ with a solution of sodium (1 part) in alcohol (10 parts), strychnic acid alone is formed; but if the temperature is raised to 70° , the product contains small quantities of isostrychnic acid.

Strychnic acid is completely converted into strychnine when it is heated at 190° in a stream of hydrogen; its other properties have been already described by Loebisch and Schoop. The *nitrosamine hydrochloride*, $C_{20}H_{22}NO(COOH):N \cdot NO, HCl + H_2O$, is obtained when the acid is treated with sodium nitrite and hydrochloric acid in the cold; it crystallizes from alcohol in yellowish prisms, is moderately easily soluble in cold water, and gives the nitroso-reaction; on reduction with zinc-dust and acetic acid, it is converted into a compound which reduces Fehling's solution, but when warmed with tin and hydrochloric acid it yields strychnic acid hydrochloride.

Strychnic acid methiodide, $C_{21}H_{24}N_2O_3MeI + H_2O$, is formed when an aqueous solution of the sodium salt of strychnic acid methiodide is acidified with dilute acetic acid, and also when methylstrychnine is treated with cold hydriodic acid; it loses its water at $120-130^\circ$,

¹ *Annalen*, **264**, 33-84; Jour. Chem. Soc., 1891, p. 1262.

and is only very sparingly soluble in cold water and alcohol, and insoluble in ether, but it dissolves freely in alkaline carbonates. It gives a nitroso-derivative on treatment with nitrous acid, and, when boiled with dilute acids, it is converted into *strychnine methiodide*, $C_{21}H_{22}N_2O_2, MeI + H_2O$. The *sodium* salt, $C_{22}H_{26}N_2O_3INa + H_2O$, prepared by heating strychnic acid with methyl iodide and alcoholic soda, or by dissolving the methiodide of strychnic acid in methyl alcoholic soda, crystallizes in long needles, and is very readily soluble in water and methyl alcohol, but only sparingly in boiling alcohol; the corresponding *silver* salt is a colorless, gelatinous, unstable compound.

Methylstrychnic acid methiodide, $C_{22}H_{26}N_2O_3MeI + H_2O$, is obtained by treating an aqueous solution of dimethylstrychnine with hydriodic acid, and, also, together with its methyl salt, by heating a methyl alcoholic solution of the sodium salt of strychnic acid methiodide with methyl iodide. It crystallizes from boiling water in small needles, loses its water at 130° , and is moderately easily soluble in hot alcohol, but insoluble in ether; when treated with a little silver nitrate and concentrated nitric acid, it gives the same blood-red coloration as dimethylstrychnine. The *methyl* salt, $C_{22}H_{25}N_2O_3Me, MeI$, separates from boiling water in short needles, and is only sparingly soluble in alcohol and chloroform and insoluble in ether and benzene; when treated with freshly-precipitated silver oxide, it is converted into a strongly alkaline substance which is decomposed on boiling with formation of dimethylstrychnine.

Methylstrychnine is highly poisonous, and feebly lævorotatory; it gives the same color reactions as strychnic acid. When treated with nitrous acid in aqueous solution, it is converted into a crystalline nitrosamine, and, when boiled with sodium ethoxide, it is transformed into a feeble base of the composition $C_{24}H_{30}N_2O_3$; this substance crystallizes from boiling alcohol in small needles, melts at 158° , and is very readily soluble in benzene, chloroform, and glacial acetic acid, but almost insoluble in water.

A *nitroso*-derivative is obtained as a yellow precipitate when dimethylstrychnine is treated with amyl nitrite in alcoholic hydrochloric acid solution; it is a semi-crystalline, very deliquescent powder, and when dried at 100° in an atmosphere of hydrogen, it has the composition $C_{23}H_{29}N_3O_4Cl_2$.

Isostrychnic acid, $C_{20}H_{22}NO(COOH):NH + H_2O$, is best prepared

by heating strychnine (100 grams) with crystalline barium hydroxide (150 grams) and water (800 grams) at 135–140°, then filtering from unchanged strychnine, and saturating the hot filtrate with carbonic anhydride; the acid is extracted from the precipitated barium carbonate with dilute soda. The anhydrous compound is very hygroscopic, and takes up 1 mol. H_2O on exposure to the air; it resembles strychnic acid very closely, than which, however, it is rather more sparingly soluble in water. It gives the same color reactions as strychnic acid, even after it has been boiled with acids, and it is not changed by boiling concentrated hydrochloric acid; it forms an oily acetyl derivative and an oily ethyl salt, and is highly poisonous. The *hydriodide*, $\text{C}_{21}\text{H}_{24}\text{N}_2\text{O}_3 \cdot \text{HI} + 2\text{H}_2\text{O}$, crystallizes in well-defined prisms and loses 1 mol. H_2O over sulphuric acid in a vacuum, the other being expelled at 110°; it is readily soluble in hot water, but only sparingly in cold water and alcohol, and insoluble in ether. The *nitrosamine hydrochloride*, $\text{C}_{21}\text{H}_{23}\text{N}_3\text{O}_4 \cdot \text{HCl} + 2\text{H}_2\text{O}$, crystallizes from hot alcohol in needles, and is readily soluble in warm water, but insoluble in ether; it is decomposed by boiling water, gives Liebermann's reaction, and, when warmed with tin and hydrochloric acid, is decomposed, with formation of strychnine.

Isostrychnic acid methiodide, $\text{C}_{21}\text{H}_{24}\text{N}_2\text{O}_3 \cdot \text{MeI}$, can be prepared by treating the sodium salt (see below) with dilute mineral acids, or by the action of hydriodic acid on an aqueous solution of isomethylstrychnine; it separates from hot water in crystals, is only sparingly soluble in alcohol, and insoluble in ether; when treated with nitrous acid, it yields a resinous nitroso-derivative. The *sodium* salt, $\text{C}_{22}\text{H}_{26}\text{N}_2\text{O}_3 \cdot \text{Na} + \text{H}_2\text{O}$, obtained by warming isostrychnic acid with methyl iodide and sodium methoxide in methyl alcoholic solution, crystallizes from hot alcohol in microscopic needles, and is readily soluble in water.

Methylisostrychnic acid methiodide, $\text{C}_{22}\text{H}_{26}\text{N}_2\text{O}_3 \cdot \text{MeI} + \text{H}_2\text{O}$, is obtained, together with its methyl salt, by heating the sodium salt of isostrychnic acid methiodide with methyl iodide in methyl alcoholic solution, or by treating isodimethylstrychnine with hydriodic acid; it crystallizes from boiling water in needles, loses its water at 130°, melts at 270–285° with decomposition, and is moderately easily soluble in hot alcohol, but insoluble in ether, chloroform and benzene. The *methyl* salt, $\text{C}_{22}\text{H}_{25}\text{N}_2\text{O}_3 \cdot \text{Me} \cdot \text{MeI} + 2\text{H}_2\text{O}$, crystallizes from boiling water in long needles, loses its water in a vacuum, and

is very sparingly soluble in alcohol, and insoluble in ether and benzene; when treated with freshly-precipitated silver chloride, it is converted into the corresponding *methochloride*, $C_{22}H_{25}N_2O_3Me$, $MeCl + 2H_2O$, which crystallizes in long, colorless needles.

Isomethylstrychnine, $C_{22}H_{26}N_2O_3 + 7H_2O$, is formed when an aqueous solution of isostrychnic acid and methiodide is treated with silver oxide, first at the ordinary temperature and then at 100° ; it crystallizes from hot water in small, colorless needles, and is very readily soluble in alcohol and hot water, but insoluble in ether and benzene; it yields a crystalline nitrosamine, and it gives the same reaction with dilute sulphuric acid and potassium dichromate as methylstrychnine, even after having been boiled with dilute acids.

Isodimethylstrychnine, $C_{23}H_{28}N_2O_3 + 3H_2O$, prepared from methyl-isostrychnic acid methiodide in like manner, or from the methyl-hydroxide of methyl methylisostrychnate, as previously described in the case of dimethylstrychnine, separates from hot water in well-defined crystals, and is readily soluble in alcohol, but insoluble in ether; it gives the same reactions with oxidizing agents and with nitrous acid as dimethylstrychnine.

The author's experiments have shown that the so-called hydrates of strychnine are isomeric imido-acids, that strychnine is an inner anhydride of strychnic acid, and that methyl and dimethylstrychnine are betaïne-like derivatives of this acid; the nitrogen atom in the $-CO-N-$ group in strychnine is in direct combination with one benzene nucleus.

BENZOYLPSEUDOTROPEINE, AN ALKALOID OF JAVA COCA-LEAVES.¹

BY C. LIEBERMANN.

The alkaloid was obtained in the form of its hydrobromide from Dr. Giesel, and was purified by extraction with ether and crystallization from boiling water.

Benzoylpseudotropeine hydrobromide, $C_8H_{14}NOBz, HBr$, crystallizes in beautiful, long leaflets, and is soluble in water and alcohol.

Benzoylpseudotropeine, $C_8H_{14}NOBz$, is obtained by decomposing the above salt with sodium carbonate and extracting with ether. On evaporating off the ether, it is obtained as an oil which solidifies

¹ *Berichte*, **24**, 2336-2345; Jour. Chem. Soc., 1891, p. 1263.

in radiating crystals. It melts at 49° , reacts strongly alkaline in alcoholic solution, is easily soluble in alcohol, ether, chloroform, benzene, and light petroleum, and is optically inactive. The *hydrochloride*, obtained by passing hydrogen chloride into an ethereal solution of the base, crystallizes in white needles, and melts at 271° . The *platinochloride* is obtained as a flesh-colored precipitate, and is insoluble in water, alcohol and ether. The *aurochloride* crystallizes from water in beautiful, yellow needles, melts at 208° , and is sparingly soluble. Mercuric chloride causes a crystalline precipitate when added to a solution of the hydrochloride. Picric acids give a sparingly soluble precipitate, crystallizing in yellow needles.

When the above base or its salts is heated with hydrochloric acid in a reflux apparatus for some hours, it is completely decomposed into benzoic acid and pseudotropine.

Pseudotropine, $C_8H_{15}NO$, is obtained from the products of hydrolysis of the above base after the benzoic acid has been extracted with ether. The acid solution is evaporated to dryness, and the hydrochloride either decomposed with silver oxide or excess of strong sodium hydroxide is added, and the base extracted with ether. It has a strongly alkaline reaction, crystallizes in beautiful needles, melts at $106-107^{\circ}$, boils at $240-241^{\circ}$ (corr.), and is easily soluble in water, alcohol, and benzene, and is precipitated from the latter solvent by light petroleum. The base is, no doubt, identical with Ladenburg's pseudotropine, although the aurochloride melts at 225° , whereas Ladenburg's melted at 198° . The *hydrochloride* crystallizes in needles, is somewhat hygroscopic, and easily soluble in alcohol. The *aurochloride* crystallizes from water in beautiful, yellow needles, and is easily soluble in alcohol and hot water. The *platinochloride*, when first prepared, is so soluble that it is necessary to evaporate the solution almost to dryness before crystallization takes place; the crystallized salt is, however, difficult to dissolve in water, and is precipitated on the addition of alcohol. Pseudotropine hydrochloride yields, with mercuric chloride, a white precipitate; with picric acid, an easily soluble salt, crystallizing in yellow needles.

The author has synthesized benzoylpseudotropine by heating pseudotropine (3 grams) with water (1.5 grams) and benzoic anhydride ($1\frac{1}{4}$ mols.) on the sand-bath for $1\frac{1}{4}$ hours at the boiling point of the mixture. The synthetical base is entirely similar to the natural one.

The author has no doubt that a series of pseudotropine, corresponding to the tropeines, can be prepared from pseudotropine. He has prepared the following :

Cinnamylpseudotropine, $C_8H_{14}NO(C_6H_7O)$, is obtained from pseudotropine and cinnamic anhydride, melts at $87-88^\circ$, and is very easily soluble in cold alcohol, ether, and benzene, somewhat less so in light petroleum. The *hydrochloride* is obtained as a white, crystalline precipitate on passing hydrogen chloride into an ethereal solution of the base, and is easily soluble in alcohol and water. The picrate, platinochloride, and aurochloride are similar to those of benzoylpseudotropine.

THE EXISTENCE OF A MYDRIATIC ALKALOID IN LETTUCE.¹

BY T. S. DYMOND.

From the Research Laboratory of the Pharmaceutival Society of Great Britain.

The attention of the author was drawn a few months ago to the mydriatic action of an extract prepared at Hitchin from common lettuce, *Lactuca sativa*, when in flower. On examination, the mydriatic action was found to be due to an alkaloid. The extract closely resembled belladonna extract in appearance, smell and taste; but a dose of 5 grains had been without injurious effects. Three other commercial extracts of lettuce were examined, viz : an extract of wild lettuce, *Lactuca virosa*, prepared according to the directions of the British Pharmacopœia, the history of which was unknown, and extracts of both the wild and the cultivated lettuce, prepared at Market Deeping, in Lincolnshire. An extract of that variety of the cultivated plant known as Cos lettuce was also examined. They all contained an alkaloid which had a very marked power of dilating the pupil of the eye. Finally, a dried specimen of wild lettuce, collected when in flower, was examined. It contained a mydriatic alkaloid.

The impure alkaloid obtained from the extract was a light brown syrup, which possessed powerful mydriatic properties. In order to purify it, it was converted into the oxalate. The alkaloid recovered

¹ The substance of a communication made to the Chemical Society on December 3d; reprinted from *Pharm. Jour. and Trans.*, Dec. 5, 1891, p. 449.

from the pure oxalate, when crystallized from chloroform, closely resembled hyoscyamine, both in appearance and in melting point. The aurochloride was then produced by the usual methods, and this, after recrystallization, was obtained in the shining flat needles characteristic of the aurochloride of hyoscyamine. The estimation of the gold and the base in this compound showed that the alkaloid was one of three isomeric mydriatic alkaloids having the formula $C_{17}H_{23}NO_3$, while its melting point was 159.75° (corr.), and closely corresponded with that ascribed by Ladenburg to the aurochloride of hyoscyamine. The plant does not appear to contain a second mydriatic alkaloid, although it must be remembered that only small quantities of material were operated upon.

The author has thus shown that both wild and cultivated varieties of lettuce, especially when the flowering stage is reached, contain hyoscyamine, the mydriatic alkaloid occurring in *Hyoscyamus niger*, *Atropa Belladonna* and other plants belonging to the natural order *Solanaceæ*, and it is probable that to the presence of this alkaloid the sedative and anodyne properties of extract of lettuce are due.

That this important constituent has been until now overlooked, is probably due to the fact that in chemical investigations upon lettuce, the dried milk sap, lactucarium, has alone been examined, although its value as a sedative and anodyne is by no means established. The author found that lactucarium of both English and German manufacture was devoid of mydriatic properties and contained no alkaloid whatever.

The fact that lettuce contains a poisonous alkaloid is not of great importance in connection with its use as a vegetable, since it is only used for this purpose in the early stages of its growth, before the bitter milk has been produced, when the hyoscyamine is only present, if at all, in minute quantities. The amount of mydriatic alkaloid in the extract prepared from garden lettuce when in flower is not more than .02 per cent. Nevertheless, cases have been recorded in which the immoderate consumption of lettuce has led to unpleasant and even fatal results. Lettuce belongs to the natural order *Compositæ*. This is the first occasion on which hyoscyamine has been found in plants not belonging to the natural order *Solanaceæ*.

The author's thanks are due to Messrs. W. Ransom & Son and to Messrs. Wright, Layman and Umney for furnishing him with specimens and information.

EXAMINATION OF CHINESE TEA.¹

BY P. DVORKOVITCH.

The author criticizes the methods of Peligot, Mulder, and Zöller for the estimation of theine in tea, and, regarding them as unsatisfactory, has devised the following process, which is said to be both rapid and exact. Ten grams of the finely powdered tea is treated with three successive quantities of 200 cc. of boiling water, five minutes being allowed for each digestion, and then boiled with two successive quantities of 200 cc. of water, or more, if necessary, until the last extract is almost, if not quite, free from color. The extracts are made up to a litre, and extracted thrice with light petroleum to remove oil, etc.; 600 cc. of the washed solution is then shaken with 100 cc. of baryta-water containing 4 grams of baryta in solution, filtered, and 583 cc. of the filtrate (corresponding with 5 grams of tea) mixed with 100 cc. of salt solution (20 grams of salt in 100 cc. of water), and thrice extracted with chloroform. The extraction is best effected by shaking successive small quantities of the solution with chloroform, since nothing further can be extracted from the solution after the third shaking under these conditions, and not more than 400 grams of chloroform is required. After removal of the chloroform, by distillation to a small bulk and subsequent evaporation in a small dish and drying at 100°, the theine is obtained in perfectly white needles.

In the preparation of black tea the leaves are submitted to a fermentation, which has a most important influence on the quality of the product, and, as Geissler has shown, is carried on at the expense of the tannin. With the object of estimating not only the tannin but also the decomposition products formed from it during the fermentation, or, in other words, determining the extent of the fermentation, the author has improved Löwenthal's method of oxidation with potassium permanganate in the presence of indigo-carmin. The solutions required are the following: (1) Decinormal oxalic acid; (2) a potassium permanganate solution of such a strength (approximately 2.6 grams in the litre) that 130 grams are equivalent to 100 grams of decinormal oxalic acid; (3) dilute sulphuric acid containing 200 grams of ordinary acid to a litre of water; (4) baryta-water containing 4 grams of baryta to 100 cc. of

¹ *Berichte*, **24**, 1945-1955; reprinted from *Jour. Chem. Soc.*, 1891, p. 1302.

water; and (5) an indigo-carmin solution prepared by mixing 50 grams of pure indigo-carmin paste with water, adding 50 grams of sulphuric acid and a litre of water, filtering, and diluting until 25 cc. of the solution require 20 cc. of the permanganate for oxidation. The tea solution (10 grams in the litre) is prepared as already described, and of this 40 cc. is diluted with 500 cc. of water, treated with 25 cc. of the indigo-carmin solution and 25 cc. of dilute sulphuric acid, and titrated with permanganate until the yellow color becomes evident. The manner in which the permanganate is added is of considerable importance, and the author states that in the titration of the indigo-carmin solution, 18 cc. of the permanganate is added at the rate of 2-3 drops per second, and the remainder at the rate of 1 drop per second, and that in the titration of the tea with indigo-carmin, 23 cc. of the permanganate is run in first of all, then 2-3 drops per second is added, and finally only 1 drop per second until the reaction is completed. If more than 38 cc. of permanganate is required in the latter titration, a smaller quantity of the tea solution should be taken for the analysis. The amount of the fermentation product is then estimated. For this purpose, 80 cc. of the tea solution is mixed with 20 cc. of baryta-water, filtered, and 50 cc. of the filtrate corresponding with $\frac{1}{25}$ th of the tea extract is diluted with 500 cc. water, mixed with 25 cc. of dilute sulphuric acid, then with 25 cc. of the indigo-carmin solution, and titrated with permanganate, 18 cc. of the solution being run in, first of all, then 2-3 drops per second added, and finally 1 drop per second until the reaction is ended. The amount of permanganate employed, less that required for the oxidation of the indigo-carmin, indicates the amount of decomposition products of tannin, or, more correctly, the degree of fermentation which the tea-leaves have undergone. The percentage of tannin and of the fermentation product is calculated by multiplying the weight of oxalic acid equivalent to the number of cc. of permanganate employed in the oxidation, by 31.3, since 63 grams of oxalic acid, according to the author's experiments, correspond with 31.3 grams of tannin, and not with 41.2 grams as stated by Neubauer.

With regard to the comparative values of teas, the author states that the higher the proportion of theine to the total amount of tannin and fermentation products, the more valuable is the tea. The analyses of teas of the first crop of 1890 are quoted in the paper,

and gave the following results: Water, 7.44-9.78; theine, 2.14-3.45; tannin, 8.84-10.55; fermentation products, 0.90-1.88; extractive matter, 30.70-34.95.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, December 15, 1891.

Mr. Chas. W. Hancock presided. The minutes of the last meeting were read, and no corrections being required, they were approved.

A friend of the college presented a fine steel engraving of the late Professor Justus Liebig.

A paper, written by A. L. Beck, Ph. G., upon the *preservation of syrup of ferrous iodide*, by replacing atmospheric air with carbonic acid gas, was read; it was accompanied with photographic illustrations of the apparatus. Several members called attention to various methods that had been used for the same purpose, such as glucose, hypophosphorous acid, a coil of iron wire, etc.

A formula for *Elixir of Yerba santa*, which was inquired for at the last meeting, was given by Mr. T. H. Strouse. Formulas were also given for *Liquor Carbonis detergens* and for several other preparations, which are occasionally called for.

A paper upon the *presence of copper in galenic preparations* was read by F. W. Haussmann, Ph.G., and gave rise to considerable discussion.

Mr. England said that it was well known that copper utensils were those most commonly employed in manufacturing establishments. This, it is to be presumed, is in consequence of their superior durability, and as copper in even minute doses is known to affect the animal economy, it is a matter well worthy of inquiry whether the use of some of the remedies employed may not produce effects which seriously embarrass the medical practitioner to explain; and as there is no rule which the commercial manufacturer conforms to but commercial success, it is a strong argument in favor of the apothecary being his own factor in all possible cases. The test for copper in such preparations is quite easy; a perfectly bright clean steel spatula kept for a short time in any extract containing it in appreciable quantities. Certain classes of extracts are less likely to contain it than others; those which contain tannin will have but little, as it is likely to be precipitated with the tannin, but if this precipitate be mixed up with the supernatant fluid, it will be more easily perceived.

D. C. B. Lowe, Ph.G., read a paper on *conveniences in the pharmacy*, pointing out a number of practical matters which facilitate the work of the apothecary.

Jos. W. England, Ph.G., read a paper upon the *medicinal use of oxygen*, and exhibited the apparatus which was used in the Philadelphia Hospital for its preparation and purification; perfect freedom from impurities, especially acids, must be insisted on.

A specimen of *colchicine* was exhibited by the kindness of Mr. C. Bullock.

A paper upon *Creasote pills*, by J. C. Roberts, Ph.G., was read by Mr. England. Several confirmed the value of the method adopted. Professor Maisch stated that good results could also be obtained by combining the creasote with some solid fat or wax and adding a vegetable powder.

C. Carroll Meyer, Ph.G., sent a paper upon a simple method of *dispensing liquids in capsules*. A model of the apparatus was exhibited by Mr. England.

Dr. Lowe alluded to a prescription calling for arsenic and strychnine, with several drops of an essential oil; it was dispensed by forming a mass of the arsenic and strychnine, dividing it, placing each pill into a capsule, then dropping the oil into each capsule and closing it up.

A paper upon a new mode of *administering iodine* was read by Mr. England. Professor Maisch stated that this method of combining iodine with sugar had been recommended about thirty years ago. The papers were, on motion, referred to the committee on publication, and after calling attention to some curious latinized prescriptions, a motion to adjourn was carried.

T. S. WIEGAND, *Registrar*.

EDITORIALS.

The new volume of the Journal, beginning with the present number, will make the sixty-fourth of its uninterrupted issue, and the twenty-second under the editorial management of the present editor. What the "Journal" has been in the past, has been placed on record; that this record shall not be dimmed will be the continued aim of the editor, who extends his sincere thanks to the friends and contributors for the many courtesies extended in the past, which, he trusts, will be continued; and it is hoped that the circle of usefulness, upon which the "Journal" can look, will be enlarged through the enlistment of the good-will and favor of many new friends.

The valuable information which is contained in the volumes issued has been made readily available through three indices, one being a *general* index, closing with the year 1870, and two *decennial* indices, closing respectively with 1880 and 1890, the latter having been issued during the past month, and all three being obtainable, at moderate prices, from the business editor. These indices deserve to be consulted by investigators and authors, the more so, since for a long period the progress of pharmacy in North America was recorded almost exclusively in the pages of the American Journal of Pharmacy.

The Philadelphia College of Pharmacy, on various occasions, invited its members and friends to a social reunion, among others, with the view of inspecting the introduction of electric lights into the college building a year ago. We then reported that many of those present on that occasion expressed the wish that such social gatherings take place more frequently in the future than had been the case in the past. Such a reunion was again held on the evening of Tuesday, December 29th, and the arrangements by the efficient committee of the preceding year were made in such a manner as to give promise of a large attendance, and to those participating, of an enjoyable evening. The latter proved to be the case, but unfortunately a violent wind and rain storm prevailing the greater part of the day until after midnight, interfered with the attendance. Several members from a distance were present, and all enjoyed the remarks made by Professor Sadtler in explaining the lantern views of interesting German and Swiss scenery; the microscopic exhibition arranged by A. P. Brown, Ph.G.; the inspection of the new Beindorf apparatus procured for the pharmacy lecture room; the collation and the music provided in the museum, and the conversational intercourse with those present.

Hospital Stewards of the United States Army.—Under date of December 15, 1891, a circular has been issued by Surgeon-General C. Sutherland, with the view of giving information to persons who may be desirous of enlisting in the hospital corps of the army. The facts and rules explained in the circular not being generally known, or known only to a very limited extent, we make room for the entire circular, which is as follows :

The Hospital Corps of the Army consists of privates, privates assigned as acting hospital stewards, and hospital stewards. A number of vacancies occur in these grades from time to time, which may be filled by enlistment from civil life and subsequent promotion.

Applicants for enlistment must be between the ages of eighteen and thirty years, unmarried, of good character and habits, able-bodied and free from disease. Such minor defects of vision as may be corrected by glasses are not regarded as a bar to enlistment.

All enlistments are for the grade of private ; but provision is made for the speedy promotion of those who show themselves to be earnest, intelligent, capable and trustworthy.

The term of service is five years ; but it may be terminated earlier if the individual is desirous of returning to civil life. Under the Act of June 16, 1890, and existing rules prescribed by the President in accordance therewith, a soldier in his first enlistment, after having served one year, may purchase his discharge for \$120, with a reduction of \$5 in the purchase price for every subsequent month until he completes three years of service, when, if he has served honestly and faithfully, he is entitled to a furlough for three months with pay and the privilege of discharge at the expiration of the furlough.

The pay of the hospital steward is \$45 per month, of the acting hospital steward \$25, and of the private \$13.

From the pay of the first year as given above, \$4 per month is retained ; but this retained money, together with \$1 per month for the third year of enlistment, \$2 per month for the fourth year, and \$3 per month for the fifth year, *in addition to the rates enumerated above*, will be paid to the soldier upon discharge provided he has served honestly and faithfully. The sums thus retained will be treated as deposits upon which interest at the rate of four per cent. per annum will be paid from the end of the year of the soldier's enlistment in which they accrued.

As regards the pay of the private the Surgeon-General has recommended that it be increased to \$19 per month ; and it is hoped that favorable action will be taken by the Secretary of War and Congress on this recommendation.

In addition to their pay, members of the Hospital Corps receive from the Government quarters, rations, clothing, bedding, etc. The money allowance for clothing is such that with care a considerable sum may be saved to be added to that which is paid on discharge.

The accepted candidate for enlistment is attached at first to one of the companies of instruction at Fort Riley, Kansas, or Fort D. A. Russell, Wyoming. He is there taught by practical demonstrations and recitations the knowledge that is needful to enable him to do his duty intelligently as a sanitary soldier, and to appreciate what are the requisites for promotion in the corps. When properly qualified by this course of instruction the recruit is sent to some military station for duty.

Privates who have served one year or more and who have displayed particular merit are recommended to the Surgeon-General for assignment to duty as acting hospital stewards. A material increase of pay, as already stated, is attached to these appointments.

Graduates in pharmacy are eligible for these positions after a service of six months to familiarize them with military drill, discipline, and the methods of the Medical Department. Before receiving his detail as acting hospital steward the candidate is required to pass an examination to demonstrate his general intelligence and the progress he has made in his special studies. The examination embraces the general principles of arithmetic, including decimal fractions and the rules of proportion, orthography and penmanship; the Articles of War and regulations affecting enlisted men, particularly in the Hospital Corps; pharmacy; the care and use of meteorological instruments and of the hospital and field appliances furnished by the Medical Department; the methods of rendering first aid to sick and wounded, and the ordinary modes of cooking.

Promotion to a stewardship is not authorized until the candidate has demonstrated his fitness for the position by one year of service as an acting hospital steward. His application must be approved by the senior medical officer of his post and by the post commander, and must bear satisfactory certification as to character, conduct, general fitness and habits, particularly in regard to the use of stimulants and narcotics. Authority is then given by the Surgeon-General for his examination, which includes the subjects already mentioned, together with minor surgery and the elements of hygiene. Passed candidates examined at or about the same time take precedence for appointment in the order of relative merit as shown by the results of their examination.

Furloughs to deserving men are granted during the term of enlistment when their services can be spared from their post of duty.

On re-enlistment at the end of five years \$2 per month is added to the rate of pay and \$1 per month more on each subsequent re-enlistment.

After thirty years of service members of the Hospital Corps are entitled to be retired, and upon retirement receive three-fourths of the monthly pay allowed by law to them in the grade they held when retired, with commutation for allowances of cloth and rations.

Applications for enlistment into the Hospital Corps should be addressed to "The Surgeon-General U. S. Army, Washington, D. C.," and should be accompanied by testimonials as to character, physical soundness, and special knowledge, as of pharmacy, etc.

CLASSES

—OF THE—

PHILADELPHIA COLLEGE OF PHARMACY,

SEVENTY-FIRST ANNUAL SESSION, 1891-1892.

JUNIOR LIST.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Abbott, William Gilbert,	Trenton,	N. J.	H. N. Richards.
Adams, Bentley Bryant,	Atlantic City,	N. J.	L. C. McClellan.
Adams, James Duffield,	Clayton,	N. J.	R. W. Maris.
Adams, Winfield Scott,	Reading,	Pa.	C. M. Steinmetz.
Albright, William Henry,	Martin's Creek,	Pa.	M. R. Albright.
Aley, Jr., Hamilton,	New York,	N. Y.	W. S. Rockey.
Alleman, Frank,	Lancaster,	Pa.	H. B. Cochran.
Althouse, Frank John,	Harrisburg,	Pa.	H. B. Todd.
Alvey, Rob. Edwin,	Mechanicsburg,	Ill.	C. M. Bird.
Ames, Charles Eugene,	DeRuyter,	N. Y.	Kenyon, Potter & Co.
Archibald, Alfred Guy,	Philadelphia,	Pa.	T. M. Newbold.
Atkins, George Hulings,	Wilmington,	Del.	Z. J. Belt.
Aughinbaugh, William Culbertson,	Hagerstown,	Md.	D. C. Aughinbaugh.
Baer, Howard,	Philadelphia,	Pa.	W. H. Llewellyn.
Bahn, Edwin Morgan,	York,	Pa.	H. A. Hay.
Bailey, John Henry,	S. Bethlehem,	Pa.	Dr. S. T. Addis.
Baker, John Saxe,	Newville,	Pa.	H. K. Mulford & Co.
Balle, Bismark Henry,	Laurens,	S. C.	J. E. Wilkes.
Barlow, Walter Gilbert,	Galion,	O.	L. E. Barlow.
Barr, David Ford,	Newark,	Del.	J. R. Smyser.
Barr, Robert Hamilton,	Philadelphia,	Pa.	Jos. McKee.
Baskett, Geo. LaFayette,	Salem,	Or.	N. F. L. VanSlype.
Benedict, William Paul,	Altoona,	Pa.	C. F. Randolph.
Bierman, Valentine,	Shenandoah,	Pa.	A. Wasley.
Blecker, Isaac Boyd,	Selinsgrove,	Pa.	J. F. Wallis.
Boadway, Jacob,	Bethesda,	Ont., Can.	C. G. A. Loder.
Bole, Jr., Robt.,	Philadelphia,	Pa.	J. B. Reynolds.
Bowman, William Frank,	Reading,	Pa.	J. C. Griesemer.
Boyle, Frank Meagher,	Dover,	Del.	C. Ouram.
Brellocks, Frederick John,	Philadelphia,	Pa.	L. W. Hildenbrand.
Bremer, Albert Herman,	Philadelphia,	Pa.	M. Sonntag.
Bric, Jay Steven,	New Haven,	Conn.	
Brickner, Herman Adam,	Canajoharie,	N. Y.	Dybert & Wohlgemuth
Brooks, James Hibbs,	Bristol,	Pa.	Serrill Douglass.
Brooks, Joseph Warren,	Pennsauken,	N. J.	Bullock & Crenshaw.
Brown, Gordon Sweatland,	Laurelton,	Pa.	G. W. Roland.
Brunier, Geo. Washington Grant,	Philadelphia,	Pa.	C. H. Bohn.
Bunting, Frank Allison,	Norristown,	Pa.	W. Stahler.
Cahill, Thomas Melville,	Staffordshire,	Eng.	Dr. J. Malatesta.
Cain, Maude Florence,	Springfield,	Mass.	
Campbell, Robt.,	Belfast,	Ireland,	Dr. Meade.
Campbell, Thomas Palmer,	Philadelphia,	Pa.	Funk & Groff.
Carpenter, Howard Preston,	Wilmington,	Del.	N. B. Danforth.
Carroll, Robt. Allen,	Philadelphia,	Pa.	S. L. Carroll.
Carson, Chas. Robt.	Mahomet,	Ill.	H. A. Newbold.
Chance, Albert Arthur,	Sudlersville,	Md.	G. B. Evans.
Cheek, Simmons Lee,	Birmingham,	Ala.	C. Shivers.
Cherdron, Charles,	Cleveland,	O.	H. Muller, M.D.
Cline, William Edward,	Orrstown,	Pa.	Dr. J. J. McFadden.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Collins, Edward Smith,	Rising Sun,	Del.	
Colsten, Geo. Henry,	Great Bend,	Pa.	C. B. Woodward.
Conard, Norman Shoemaker,	Philadelphia,	Pa.	Dr. T. E. Conard.
Connor, Edward Brooke,	Philadelphia,	Pa.	A. Y. Gerhard.
Connor, Edwin Cairl,	Philadelphia,	Pa.	H. B. Taylor.
Conover, Samuel Harry,	Philadelphia,	Pa.	A. J. Schofield.
Cook, William Stephen Gray,	Coatesville,	Pa.	S. G. Cook.
Corson, Linwood Shamgar,	Seaville,	N. J.	E. W. Sharp.
Cox, Harry Lehman,	Ephrata,	Pa.	G. S. Royer.
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Croushore, Henry Geo.,	Grapeville,	Pa.	Sowash & Fink.
Dancy, Henry Hyman,	Tarboro,	N. C.	W. H. MacNair.
Dannenbauer, Frederick,	Philadelphia,	Pa.	W. A. Pettus.
Davis, Geo. Warren,	Scranton,	Pa.	A. B. Reed.
Davis, William,	Mt. Carmel,	Pa.	Williams & Co.
Daws, William Ruth,	Scranton,	Pa.	Henwood & Co.
Deibert, William Henry,	Stemton,	Pa.	J. H. Masholder.
Deining, John Wolfersberger,	Mt. Joy,	Pa.	H. L. Barber.
Dengler, Geo. Ludwig,	Reading,	Pa.	J. A. Gingrich.
Desmond, Edward,	Buffalo,	Wyo.	F. H. Eggleston.
Detwiler, William Penn,	Oak Station,	Pa.	I. M. Buckwalter.
Dietrich, Harry Daniel,	Reading,	Pa.	C. Rentschler.
Dittenhofer, Mortimer Abraham,	Mansfield,	O.	W. M. Barton.
Donough, Chas. Schæffer,	Myerstown,	Pa.	Dr. W. C. Kline.
DuBois, B. Frank,	Atlantic City,	N. J.	J. Du Bois.
Eberly, David Alex.,			C. A. Eckels.
Eisenhart, Ellwood Obadiah,	Hellertown,	Pa.	F. P. Eisenhart.
Eisenhart, Harry P.,	York,	Pa.	B. S. Gilbert.
Elm, Paris Foster,	Shippensburg,	Pa.	J. C. Altick & Co.
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Fadeley, Robt. Wesley,	Philadelphia,	Pa.	J. Huston.
Faries, William Edwin,	Smyrna,	Del.	L. C. Funk.
Faust, Peter,	Scranton,	Pa.,	C. Lorenz.
Fischer, Frederick Franklin,	Philadelphia,	Pa.	E. C. Vogelbach.
Fisher, Edmund Keim,	Lititz,	Pa.	E. B. Kyle.
Flanagan, Thom. Francis,	Mahanoy City,	Pa.	A. A. Weber.
Fluss, Julius,	Harrisburg,	Pa.	Dr. Raser.
Fraunfelder, Jacob Adams,	Easton,	Pa.	F. G. Thoman.
Furnel, Carl Bennett,	Wilton,	Me.	W. H. Braddock.
Gargan, John Joseph,	Philadelphia,	Pa.	C. J. Biddle.
Garver, Walter Joseph,	Hagerstown,	Md.	Blew & Lucas.
Gebhardt, Ehr Gott William,	Philadelphia,	Pa.	E. Graff.
Gary, John Harry,	ThurLOW,	Pa.	W. C. Kelly.
Gibson, Hiester Franklin,	Reading,	Pa.	Dr. S. C. Blair.
Glitschka, Henry,	Bismark,	N. D.	F. Frisby.
Goico, Ernest,	Porto Rico,	W. I.	C. J. Monagas.
Goehring, John Geo.,	W. Newton,	Pa.	R. D. Humes.
Gorman, Patrick James,	S. Bethlehem,	Pa.	H. T. Addis.
Gould, Fred. Burr,	Farmer City,	Ill.	S. B. Gower & Son.
Gregory, Robt. Nicholson,	Quincy,	Fla.	Munroe & Scott.
Grubb, Geo. Henry,	Pughtown,	Pa.	J. C. Sanderson.
Haas, Frederick William,	Nazareth,	Pa.	E. G. F. Micklely.
Haas, William Arthur,	South Easton,	Pa.	A. N. Richards.
Haenchen, Emil Frank,	Philadelphia,	Pa.	C. E. Haenchen.
Hahn, Charles,	Minersville,	Pa.	C. E. Howard.
Harms, Herman,	Hamburg,	Germany.	Roberts & Nelden.
Hand, Alfred,	Freeport,	N. Y.	L. H. Wilson.
Haney, Mary Augusta,	Eastport,	Me.	Dr. Grady.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Hargrave, Seymour Livingston,	Snow Hill,	N. C.	R. Fitch.
Harrold, William Henry,	Conshohocken,	Pa.	Dr. J. M. Bradford.
Hart, Joseph Aloysius,	Philadelphia,	Pa.	Fetters & Hertel.
Harter, Charles Schaeffer,	Tylersville,	Pa.	
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Haug, Clarence Godfrey,	Philadelphia,	Pa.	H. K. Mulford.
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Helm, Robt.,	Philadelphia,	Pa.	Nolte & Reimann.
Hendee, Ulysses Grant,	Jamestown,	N. Y.	Hatch & Briggs.
Herlihy, James Aloysius,	Chillicothe,	O.	Dr. C. Chestnut.
Herrmann, William,	Middleport,	Pa.	A. Cable.
Hess, Miles Roscoe,	Hellertown,	Pa.	M. S. Apple.
Hertel, Julius Ernst,	Nashville,	Ill.	W. H. Gruhs.
Hiller, William Frederick,	Osseo,	Minn.	J. F. Donek.
Hinkel, Henry John,	Philadelphia,	Pa.	H. C. Cooley.
Hinkle, Samuel Wisler,	Columbia,	Pa.	P. S. Brugh.
Holcombe, David Hamilton,	Bridgeton,	N. J.	C. F. Dare.
Hollopeter, Arthur Stadiger,	Shenandoah,	Pa.	F. W. E. Stedem.
Holzinger, John Rewalt,	Wrightsville,	Pa.	G. S. Tinsley.
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Horting, Geo. Washington,	Ephrata,	Pa.	C. C. Spannagel.
Hoskins, John,	Elwyn,	Pa.	Wm. Procter, Jr. & Co.
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Hunsberger, Ambrose Souders,	Soudertown,	Pa.	C. E. Spenceley, Ph.G.
Jackel, John Otto Peter,	Philadelphia,	Pa.	G. D. Jones.
Jaeger, Ernst Charles,	Neosho,	Mo.	A. B. Powers.
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Jones, Henry Abner,	Lansford,	Pa.	Kennedy & Burke.
Jones, Jr., Pleasant Richard,	Danville,	Va.	P. R. Jones.
Jones, William Willits,	Williamsport,	Pa.	Duble & Cornell.
Kauffman, John William,	Norristown,	Pa.	Dr. W. H. Hickman.
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Keller, Robert Jacob,	Easton,	Pa.	J. C. Sanderson.
Kelley, T. J.,	Philadelphia,	Pa.	Dr. A. F. Tod.
Kennedy, Edwin Russell,	Zanesville,	O. W. M.	Chappelear & Son Co.
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Kinard, Harry,	Craley,	Pa.	Elias Herr.
Kinsey, Joseph Samuel,	New Philadelphia,	O.	F. C. Miller & Son.
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Kirk, Lewis Richardson,	Rising Sun,	Md.	L. R. Kirk.
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Koch, Harry Warren,	Bethlehem,	Pa.	H. A. Burkhardt.
Kocher, David Geo.,	Balliettsville,	Pa.	A. J. Kendig.
Koeppen, Albert Chas.,	Sioux Falls,	S. D.	I. F. Dunning.
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Kottka, Rav Weaver,	Philadelphia,	Pa.	D. L. Stackhouse.
Kramer, Jesse Ray,	Williamsport,	Pa.	M. Huber.
Kreider, Harry Clinton,	Lebanon,	Pa.	D. F. Shull & Co.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Kyner, Thomas Kennedy,	Orrstown,	Pa.	J. A. Kyner.
Lacey, Chas.,	Ridley Park,	Pa.	F. E. Harrison.
Lamar, William Robinson,	Augusta,	Ga.	S. C. Durban.
Lanterman, Bartley LaRue,	Blairstown,	N. J.	A. Lincoln Serfass.
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Leedom, Morris,	Philadelphia,	Pa.	Watt & Leedom.
Legg, Frederick Arthur,	Salem,	Or.	Dr. Horace Cox.
Leh, Geo. Dodson,	Bethlehem,	Pa.	Dr. C. B. Lowe.
Lehman, Joseph Davis,	Manayunk,	Pa.	H. M. Levering.
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Lloyd, Richard Louis,	Philadelphia,	Pa.	Bullock & Crenshaw.
Long, James Grier,	Coatesville,	Pa.	
Loper, Chas. P.,	Philadelphia,	Pa.	C. H. Haentze.
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Lower, Geo. Grafley,	Philadelphia,	Pa.	Wiley & Wallace Co.
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Lynch, Dan'l Jos.,	Plymouth,	Pa.	Dr. K. H. Franklin.
Lynn, Wm. Wirt,	Philadelphia,	Pa.	W. H. Lantz.
McClellan, Samuel Lee,	Cochranville,	Pa.	S. K. Hammond.
McCoy, Cornelius Jos.,	Conshohocken,	Pa.	Dr. T. H. Franklin.
MacCracken, Edward Glover,	Philadelphia,	Pa.	J. W. Pechiu.
McCreight, Chas.,	Philadelphia,	Pa.	Robert McNeil.
MacDermott, James,	Philadelphia,	Pa.	Girard College.
MacDonald, Frederick Thomas,	Avondale,	Pa.	C. H. Megilligan.
McGlade, John,	Pittsburgh,	Pa.	H. Diefenbeck.
McHale, Francis Patrick,	Dunmore,	Pa.	M. S. Stark.
McNeal, Harry Benny,	McDanieltown,	Md.	John H. Fredericks.
Mackie, Arthur Andrews,	Fairhill,	Md.	W. R. Warner & Co.
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Manko, Emanuel,	Trenton,	N. J.	S. E. R. Hassenger.
Mann, Harry Eastwood,	Burlington,	N. J.	S. W. Lippincott.
Martin, Samuel E.,	Wilmington,	Del.	F. W. Fenn.
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Mentzer, Harvey H.,	Carlisle,	Pa.	V. H. Ritchey.
Merscher, Geo. Edward,	Philadelphia,	Pa.	J. R. Moechel.
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Miller, Geo. M.,	Sumneytown,	Pa.	J. S. Miller.
Missildine, Arthur Huntington,	Winter Park,	Fla.	John Ogden.
Missimer, Harry Drexel,	Reading,	Pa.	C. Rentschler.
Mohr, Frank Martin,	Philadelphia,	Pa.	D. Milligan.
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Nick, Wm. Herman F.,	Erie,	Pa.	W. F. Nick.
Nolan, Daniel Andrew,	Southington,	Conn.	Campbell & Bro.
Nusbaum, Benjamin,	Philadelphia,	Pa.	A. Oettinger.
Odbert, Alex. Laughlin,	Wheeling,	W. Va.	C. H. Odbert.
Opperman, Paul Julius,	Cleveland,	O.	E. Opperman.
Pashley, Frederick Henry,	Bridgeton,	N. J.	D. A. Bowen.
Paullin, Geo. Lambert,	Shiloh,	N. J.	H. F. Seeley.
Pennington, G. M.,	Stannardsville,	Va.	Wills Drug Co.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Philips, Geo. Warren,	Garden,	Pa.	J. E. Gregory.
Philips, Robert Hazlett Cummings,	Philippings, Trenton,	N. J.	Dr J. W. Ward.
Pickett, Jas. Frank,	Newhope,	Pa.	Dr. S. Jones.
Pickering, Geo. Wellington,	South Gibson,	Pa.	F. Branton.
Pollak, Berthold Steinbach,	Vienna,	Austria,	W. H. Sutton,
Poole, Henry Harrison Higbee,	Bristol,	Pa.	H. G. Peters.
Powders, John Arthur,	Orrstown,	Pa.	Dr. Emil Reith.
Price, Harry Dunbavon,	Independence,	Mo.	F. Price.
Prizer, Walter Wm.,	Norristown,	Pa.	Baker & Grady.
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Quick, Benj. Chamberlin,	Port Jarvis,	N. Y.	S. St. John.
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Reeser, Wm. Howard,	Reading,	Pa.	L. P. Bowers.
Reeves, Andrew Higgins,	Cape May,	N. J.	J. Mecray.
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Risley, John Clarence,	Wilmington,	Del.	E. B. Fell.
Rogers, John Wilson,	Independence,	Mo.	C. J. Gebauer.
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Ruete, Otto Moyer,	Dubuque,	Ia.	T. W. Ruete.
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Sage, Thos.,	Blossburg,	Pa.	S. Bowen.
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Schnuerer, Geo. John,	Cleveland,	O.	H. Tilke.
Schumann, August Frank,	Philadelphia,	Pa.	R. G. S. Weber.
Seiffert, Frank Morris,	York,	Pa.	B. S. Gilbert.
Sellers, Oscar Wm.,	Windsor Castle,	Pa.	G. W. Fehr.
Sellen, Edward,	Davenport,	Ia.	C. F. Jappe & Co.
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Shore, Washington,	Philadelphia,	Pa.	
Simonis, Jr., Otto,	Philadelphia,	Pa.	W. A. Rumsey.
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Smith, Jesse Kirk,	Downingtown,	Pa.	P. Fitch, M.D.
Smith, Jos. Vanest,	Philadelphia,	Pa.	R. W. Cuthbert.
Smith, Lizzie Pierce Eldridge,	Philadelphia,	Pa.	W. H. Hickman, M.D.
Smith, Robert Victor,	York City,	Pa.	Dale Hart & Co.
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Snyder, Frank Howard,	Mahanoy City,	Pa.	J. W. Snyder.
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Stanton, Thomas Jefferson,	Chester,	Pa.	R. H. Henderson.
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Steltz, Harry Smoyer,	Pottstown,	Pa.	Dr. C. Trego.
Stern, Chas. Wilson,	Smyrna,	Del.	F. E. Morgan.
Stewart, Samuel Shelton,	Leetonia,	O.	H. H. Ink & Co.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Stratton, Jas. Pennington,	Woodstown,	N. J.	Borton & Andrews.
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Stroup, Clement Bryant,	Elizabethville,	Pa.	Dr. J. C. Stroup.
Sutton, John Dorrance,	Wilkesbarre,	Pa.	Dr. C. W. Spayd.
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Thompson, Benjamin Spangler,	Carlisle,	Pa.	J. E. Sipe.
Todd, Chas. Kelly,	Harrisburg,	Pa.	S. L. Nell.
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Weakley, Chas. Carpenter,	Media,	Pa.	Geo. Holland.
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Whiteley, Jos. C.,	Philadelphia,	Pa.	G. C. Webster.
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Whitman, Wm. Jas.,	Philadelphia,	Pa.	F. F. Drueding.
Wilcox, Wm.,	Blackwood,	N. J.	R. Willard.
Williams, Herbert Forrest,	Tamaqua,	Pa.	J. L. Patterson.
Wilson, John Swain,	Burlington,	N. J.	H. B. Weaver.
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Wissler, Arthur John,	Edinburg,	Va.	H. C. Blair's Sons.
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Bailey, John,	Canterbury,	Del.	J. A. Cox & Co.
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Berg, Leroy,	Tyrone,	Pa.	M. S. Falk.
Berkemeyer, Francis Molton,	Allentown,	Pa.	Dr. L. C. Berkemeyer.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Berkstresser, Watson J.,	Huntington,	Pa.	J. H. Black & Co.
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Birk, William Martin,	Indianapolis,	Ind.	G. F. Borst.
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Brennan, John Thomas,	Philadelphia,	Pa.	Dr. R. J. Kelly.
Brick, Harry Walter,	Fitchburg,	Mass.	Bullock & Crenshaw.
Bromley, Rufus Wilder,	Philadelphia,	Pa.	
Brown, Albert Ludwig,	Reading,	Pa.	McCurdy & Dunham.
Brown, Charles,	Philadelphia,	Pa.	W. J. Pechin.
Brown, Edmund Lee,	Marshall,	Mo.	M. A. Brown.
Butcher, Charles Monroe,	Parkersburg,	W. Va.	Wm. W. Kain.
Calhoun, Albert Reid,	Philadelphia,	Pa.	Horace Moll.
Cameron, Elmer Lindsay,	Chambersburg,	Pa.	J. S. Nixon & Son.
Campbell, Joseph,	Chestnut Hill,	Pa.	J. L. Kooker.
Campbell, Theodore,	Daretown,	N. J.	W. H. Pile & Son.
Carey, Harry Caspar,	Bridgeport,	N. J.	H. C. Blair's Sons.
Carney, Geo. Elmer,	Philadelphia,	Pa.	
Carter, Herbert Gent,	Philadelphia,	Pa.	Jos. Moffett, Jr.
Casey, John Francis,	Philadelphia,	Pa.	Bullock & Crenshaw.
Chalfant, William Windle,	Unionville,	Pa.	L. C. Funk.
Clair, Jos. Sylvester,	Camden,	N. J.	W. R. Weiser.
Clark, William Gorgas,	Harrisburg,	Pa.	J. R. Smyser.
Coffey, Maurice Grant,	Lock Haven,	Pa.	G. W. Mason.
Collins, Thomas Philip,	Tiffin,	O.	J. F. Marquardt & Son
Conard, Geo. McClellan,	Philadelphia,	Pa.	C. H. Senderling.
Conyers, Zeb. Vance,	Tarboro,	N. C.	Stenton & Zoeller.
Cornell, Wharton Landis,	Wilmington,	Del.	N. B. Danforth.
Craig, Charles Franklin,	Massillon,	O.	E. S. Craig.
Croft, Wm. Kinnard,	St. Thomas,	Pa.	J. L. Barnitz.
Cushen, Harry Roscoe,	Hagerstown,	Md.	E. R. Gatchel.
Daniels, Geo. Edmund,	Pueblo,	Col.	A. C. Daniels.
Davis, Benj. Franklin,	Lebanon,	Pa.	W. L. Hartzell.
Davis, Harry Morgan,	Upper Darby,	Pa.	Harry Cox.
Deen, William Lewis,	Lancaster,	Pa.	R. H. Lackey.
DeFord, Chas. Henry,	Ottawa,	Kan.	C. L. Becker.
DeLaCour, Jos. Carl,	Camden,	N. J.	J. C. DeLaCour.
DeVries, Jr., Robt. Tivis,	Wheeling,	W. Va.	Chas. Menkemeller.
Donecker, Edwin Alfred,	Allentown,	Pa.	Petus & Smith.
Donoghue, Robt. Ligorius,	Philadelphia,	Pa.	W. A. Musson.
Dowd, Andrew William,	Hastings,	Neb.	Dr. A. H. Smith.
Driesbach, Luther Albert,	Easton,	Pa.	W. E. Hammon.
Durham, John McCurdy,	Reading,	Pa.	McCurdy & Durham.
Eckhard, Schuyler Colfax,	Coldwater,	Kan.	Dr. J. E. Sombart.
Elliott, Arthur Hugh,	Mansfield,	Pa.	Dr. C. V. Elliott.
Elston, Clarence William,	Downingtown,	Pa.	J. H. Stermer.
Eppley, John Hake,	Three Rivers,	Mich.	W. K. Mattern.
Eppstein, Jacob,	Hoppstaedten,	Germany,	H. F. Backenstoe.
Eshbach, William Wallace,	Bethlehem,	Pa.	Geo. P. Kern (dec'd).
Fadeley, Robt. Wesley,	Philadelphia,	Pa.	James Huston.
Failing, John Peter,	Palatine Bridge,	N. Y.	H. K. Mulford & Co.
Ferguson, Enoch Pennock,	Coatesville,	Pa.	J. C. Roberts.
Fessler, Thos. Addison,	Muncy,	Pa.	J. W. Frey.
Finkbinder, Martin Luther,	Parker's Ford,	Pa.	L. J. Shuler.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Finkeni, Wm. Caspar,	Camden,	N. J.	Dr. G. W. Henry.
Finney, John Jos.,	Conshohocken,	Pa.	H. G. J. Hallowell.
Fox, James Floyd,	Newton,	Kan.	J. W. Hurst.
Frankelberger, Allen J.,	Lewisberry,	Pa.	J. J. Ottinger.
Fredericks, Henry,	Philadelphia,	Pa.	L. C. Funk.
Furman, Josiah Hodgkinson,	Bloomsburg,	Pa.	G. B. Evans.
Gabler, Theodore Julius,	Philadelphia,	Pa.	F. N. Willard.
Garcia, Juan Reyes,	Porto Rico,	W. I.	R. C. Martin.
Gillespie, Wallace Gault,	Philadelphia,	Pa.	Bullock & Crenshaw.
Githens, Frank Smith,	Salem,	N. J.	H. K. Mulford & Co.
Goodman, James,	Mahanoy City,	Pa.	G. W. Davenport.
Gradwohl, John Frederick,	Wilmington,	Del.	Z. J. Belt.
Green, William Valentine,	Reading,	Pa.	R. R. May.
Gressley, William Robt.,	York,	Pa.	J. E. Lehman.
Grotevent, John Frederick,	Harrisburg,	Pa.	Dr. T. E. Conard.
Guerin, Joseph Alex.,	Summerville,	S. C.	Dr. H. C. Guerin.
Guest, Owen Lovejoy,	Swedesboro,	N. J.	S. S. Guest.
Hadley, Harry Cornish,	Kenett Square,	Pa.	D. W. Hutchison.
Hahn, Herman Frederick,	Harrisburg,	Pa.	Dr. G. H. Markley.
Hahn, Moses Alex.,	Mobile,	Ala.	J. T. Hawkins.
Haines, Oliver Benj. Jacob,	Litzenberg,	Pa.	J. V. Slaughter.
Haines, Jos. Ridgeway,	Lumberton,	N. J.	Prickett & Barrington.
Hall, Chas. Albert,	Renovo,	Pa.	W. E. Hall (dec'd).
Hall, Thos. Murphy,	Middleton,	Del.	H. Knight.
Hallowell, Bruce Clyde,	Philadelphia,	Pa.	G. S. R. Wright.
Hand, Harry Cobb.,	Cape May C. H.,	N. J.	J. Way.
Harbach, Edward Jacob,	Reading,	Pa.	W. L. Cliffe.
Harders, MaeThompson,	Philadelphia,	Pa.	Susan Hayhurst, M.D.
Haydock, Susanna Garrigues,	Philadelphia,	Pa.	Susan Hayhurst, M.D.
Head, Ray C.,	Latrobe,	Pa.	
Healy, Jos.,	Philadelphia,	Pa.	J. T. Shinn.
Hechler, Edward Henry,	Cleveland,	O.	G. L. Hechler.
Heckler, Jr., Franklin Jacob,	Columbia,	Pa.	P. S. Brugh, M.D.
Heim, William Joseph,	Philadelphia,	Pa.	E. Jungmann.
Henritzy, Oscar Edwin,	Slatington,	Pa.	John B. Reynolds, Ph.G.
Henry, William Frederick,	Bellaire,	O.	M. N. Mercer.
Hersey, Walter Hayes,	Wilmington,	Del.	J. S. Beetem.
Hess, Harry Reed,	Montgomery,	Pa.	Dr. C. B. Lowe.
Hickman, Thomas Elwood,	Lombard,	Md.	W. H. Hickman, M.D.
Hilpert, William,	Philadelphia,	Pa.	Dr. J. J. Beyer.
Hobson, William Heverin,	Dover,	Del.	F. Dunning.
Hodgson, Edwin,	Newport,	Tenn.	H. E. Jones.
Holtzhauser, Geo. Jacob,	Landau,	Germany,	C. A. Werckshagen.
Hornby, Walter Melvin,	Roxboro, Phila.,	Pa.	H. H. Anderson.
Hutchison, Burt Taylor,	Bangor,	Pa.	S. E. R. Hassinger.
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Jacoby, William Lawless,	Philadelphia,	Pa.	Bullock & Crenshaw.
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Jordan, Howard Marion,	Burlington,	Ia.	Price & Weise.
Kaercher, Henry Festus,	Youngstown,	O.	W. C. Gans
Kalenborn, Rudolph Alexis,	Tacoma,	Wash.	Stewart & Holmes Drug Co.
Karcher, James Daniel,	Marmosa,	N. J.	Dr. T. C. Wheaton.
Kearns, William,		Ireland.	J. P. Mallon.
Keiper, Harvey Lafayette,	Allentown,	Pa.	A. Weber.
Ketterer, Martin,	Philadelphia,	Pa.	E. E. Wilson.
Keyes, Minor Ellery,	Gravity,	Pa.	W. A. Converse.
Kimmerer, Geo. Carl,	Canajoharie,	N. Y.	W. S. Bellinger.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Kline, Alvin B.,	Bellefonte,	Pa.	F. P. Green.
Kline, Harry Jos.,	Wilkesbarre,	Pa.	Dr. C. W. Spayd.
Klopp, Louis Calvin,	N Heidelberg,	Pa.	Dr. P. P. Klopp.
Kocher, David Geo.,	Balliettsville,	Pa.	A. J. Kendig.
Kogelschatz, John William,	Martinsburg,	W. Va.	J. B. Hall.
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Krall, John Thomas,	Philadelphia,	Pa.	C. C. Sanderson.
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Kunkel, Willis Geo.,	Bloserville,	Pa.	W. F. Horn.
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Lambert, Geo. Taylor,	Philadelphia,	Pa.	G. B. Evans.
Lammer, Henry Bruno,	Philadelphia,	Pa.	Smith, Kline & French Co.
Lammer, Jacob Sigmund,	Philadelphia,	Pa.	F. J. Lammer.
Landis, Chas. Paul,	Roxboro, Phila.,	Pa.	C. Petzelt.
Landon, Francis Patterson,	Salem,	Va.	H. G. Comp.
Larkins, Charles Thomas,	E. Liverpool,	O.	W. W. Robinson.
Lefferts, Henry Tomlinson,	Southampton,	Pa.	J. V. Antill.
Leidich, Sylvester Weidknecht,	Bethlehem,	Pa.	R. Kindig, M.D.
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Lilly, Howard Harrison,	Pottsville,	Pa.	J. Williamson.
Lippincott, Jesse Diverty,	Woodbury,	N. J.	A. S. Marshall.
Lipscomb, Lawton Carlisle,	Columbia,	S. C.	Dr. D. S. Pope.
Long, Howard Edgar,	Reading,	Pa.	J. C. Sanderson.
Long, Jr., Wm. Henry,	Philadelphia,	Pa.	William Harris.
Lorah, James Reber,	Lorah,	Pa.	N. G. Ritter.
Lorah, Lester Irwin,	Emlenton,	Pa.	S. S. Myers.
Lowe, Francis Adolph,	Kansas City,	Mo.	M. Noll.
Luchsinger, Samuel Charles,	Monroe,	Wis.	W. P. Stearns.
Lumb, Chas. Thomas,	Philadelphia,	Pa.	A. S. Lumb.
Lupin, Emanuel,	Russia,	Europe,	H. K. Mulford.
Lynch, Edmund Thomas,	Wilmington,	Del.	E. P. Stephens.
MacDermott, Sarah,	Media,	Pa.	G. C. Webster.
Mackey, Geo. Clarence,	Belvidere,	N. J.	H. C. Blair's Sons.
Manning, Chas. LaForge,	Philadelphia,	Pa.	R. W. Maris.
Martin, James Henderson,	Maysville,	Ky.	G. M. Phillips.
McBride, James Edward,	S. Bethlehem,	Pa.	J. E. Grove.
McCandless, Edward Sloan,	Philadelphia,	Pa.	H. C. Eddy.
McCartney, Frank Stewart,	Altoona,	Pa.	W. C. McCartney.
McCokle, William,	Philadelphia,	Pa.	T. A. Walker.
McCormick, Robt. Rogers,	Mechanicsville,	Ia.	G. W. Huston.
McDonnell, Chas. Pancratius,	Philadelphia,	Pa.	Dr. J. M. Wallis.
McFarland, Robert,	Philadelphia,	Pa.	W. V. Stansbury.
McFarland, Robt Munford,	Henderson,	Ky.	C. F. Kleiderer.
McKee, Francis Town,	Wilmington,	Del.	J. P. Williams.
McLaughlin, Raphael Alfred,	Philadelphia,	Pa.	J. Wyeth & Bro.
McWilliams, Samuel,	Jennersville,	Pa.	T. L. Buckman.
Megert, Geo. Emery,	Granbury,	Tex.	E. Megert.
Mengel, Chas. Edward,	California,	Mo.	A. F. Snow.
Meroney, John P.	Camden,	S. C.	Dessaure & DeLorme.
Merrifield, Robt ,	Scranton,	Pa.	Ella Amerman (dec'd).
Meyers, Louis Joseph,	Conshohocken,	Pa.	C. Moylan.
Miller, John Harvey,	Pottsville,	Pa.	Dr. C. D. S. Fruh.
Miller, Roshier,	Honeybrook,	Pa.	W. L. Turner & Son.
Milliken, Wm. Huston,	Philadelphia,	Pa.	E. C. Jones.
Mitchell, Henry,	Philadelphia,	Pa.	C. W. Hallowell.
Monaghan, Wm. Joseph,	Girardville,	Pa.	J. H. Evans.
Moore, Frank Reynolds,	Clarksburgh,	W. Va.	H. L. Wells.
Morgan, Julius Everard,	Smithfield,	N. C.	H. C. Blair's Sons.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Morris, Chas. Henry,	Loganton,	Pa.	H. L. Stiles.
Mueller, Chas. August,	Philadelphia,	Pa.	Alex. Keller.
Mendorf, Harry Kempton,	York,	Pa.	G. W. Fulmer.
Murrell, Alex. Harrison,	Allen,	Md.	Dr. H. H. Sherk.
Myers, Henry Joseph,	Philadelphia,	Pa.	J. B. Cook.
Netherton, Samuel Oliver,	Eureka,	Kan.	E. N. Bailey & Co.
Neville, William,	Conshohocken,	Pa.	H. K. Kroh.
Nichols, Albert Spencer,	Syracuse,	N. Y.	I. Cohen.
Noon, Edward John,	Philadelphia,	Pa.	Louis Genoia.
Nye, Frederick John,	Groton,	N. Y.	N. A. Collings.
Oberhauser, Wm. Phillips,	Peoria,	Ill.	J. S. Bell.
O'Brien, Wm. Joseph,	Lambertville,	N. J.	M. Campbell & Bro.
Odwalt, Wood Morris,	Piedmont,	W. Va.	H. C. Shaw.
Parvin, Harry Rocap,	Bridgeton,	N. J.	A. S. Elwell.
Paxson, Elmer May,	Philadelphia,	Pa.	H. J. Batdorf.
Pazmiño, Francisco,	Ecuador,	S. A.	H. C. Manlove.
Peacock, Josiah Comegys,	Millington,	Md.	Henry Trimble, Ph.M.
Pellett, Gurdon Ellis,	Scranton,	Pa.	R. W. Cuthbert.
Pfromm, Geo. W.,	Philadelphia,	Pa.	D. S. Wiltberger.
Peters, Rewellin Cornelius,	Allentown,	Pa.	C. J. Biddle.
Peterson, Walter Vickerstoff,	Philadelphia,	Pa.	C. W. Shull.
Pettyjohn, Wm. Quinn,	Groveland,	Ill.	Frost & Ruif.
Portser, Chas. Henry,	Saltsburg,	Pa.	Dr. H. C. Watt.
Post, Francis Elmer,	Towanda,	Pa.	H. C. Lutz.
Putnam, Silas Oscar,	Leavenworth,	Kan.	J. H. Field.
Quattlebaum, Michael Jenkins,	Batesburg,	S. C.	O. J. Harris.
Randal, Harry Lee,	Shepherdstown,	W. Va.	S. C. Sanderson.
Ranney, Edwin Cole,	Red Cloud,	Neb.	Hicks Brothers.
Reap, Edward Augustus,	Pittston,	Pa.	J. Feldman.
Reid, Vivian Ivanhoe,	Kansas City,	Kan.	Randles & Son.
Reidenbach, Elmer Augustus,	Lititz,	Pa.	H. B. Cochran.
Reif, Ernest,	Philadelphia,	Pa.	L. J. Steltzer.
Reifsnyder, David Ernst,	Berks County,	Pa.	Dr. Donough.
Remington, Samuel Jacobs,	Philadelphia,	Pa.	John Wyeth & Bro.
Richardson, James Henry,	Charlestown,	Md.	Dr. L. R. Kirk.
Rishton, Wm. Sloan,	Bloomsburg,	Pa.	J. H. Mercer.
Roberts, Rees Connard,	Norristown,	Pa.	J. B. Hall.
Robertson, John,	Mt. Carmel,	Pa.	Dr. A. F. Tod.
Robertson, Wm. Franklin,	Waelder,	Tex.	Dr. H. W. Robertson.
Roth, Theodore Wm.,	Philadelphia,	Pa.	G. H. Ischler.
Rothermel, John Palmer,	Kelly's X Roads,	Pa.	C. H. Clark.
Rothwell, Walter,	Hatboro,	Pa.	Dr. S. D. Marshall.
Ruff, W. Gilbert,	Bryansville,	Pa.	S. E. R. Hassinger.
Rynard, Chas. Warren,	Harrisburg,	Pa.	J. B. Nicholas.
Sahm, Louis Napoleon,	Boonville,	Mo.	Wm. Mittelbach.
Scheirer, Victor D.,	Allentown,	Pa.	A. B. Wenrich.
Schmehl, Irvin,	Reading,	Pa.	Dr. L. G. Bauer.
Schmerker, Chas. Frederick,	Allentown,	Pa.	G. K. Binkley.
Schneider, Chas.,	Philadelphia,	Pa.	W. H. Zeigler.
Schroeder, Martin Bernard,	Philadelphia,	Pa.	J. A. Murtagh.
Schuster, Jos. Barnard,	Egg Harbor,	N. J.	Bullock & Crenshaw.
Scott, Geo. Colton,	Philadelphia,	Pa.	J. T. White.
Scull, James Ireland,	Atlantic City,	N. J.	A. D. Cuskaden.
Shafer, Erwin Clement,	Montoursville,	Pa.	G. C. Saeger, M.D.
Shaw, Frederick Chas.,	Zanesville, O.	W. M.	Chappelear & Sons Co.
Sheehan, Edward Joseph,	Utica,	N. Y.	J. Ogden & Co
Shumaker, Chas M.,	Manning,	Ia.	Dr. G. M. Barber.
Sickel, Wm. A.,	Bristol,	Pa.	E. Martin.
Siegfried, Howard Jos.,	Nazareth,	Pa.	E. M. Boring.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Simmons, Frank Waters,	Pottsville,	Pa.	W. H. Smith.
Simmons, Geo Arthur,	Moores,	Pa.	F. E. Harrison.
Singer, Robt. Lamberton,	Harrisburg,	Pa.	Dr. A. E. Eyster.
Slick, Ross Merryman,	Mechanicstown,	Md.	H. G. Shinn.
Smith, Allen Henry,	Quakertown,	Pa.	T. E. Conard.
Smith, Daniel Evans,	Millville,	N. J.	Dr. H. C. Smith.
Smith, Geo. Lewis,	Orrstown,	Pa.	J. B. Moore.
Smucker, Milton Clyde,	Newark,	O.	F. D. Hall.
Sorber, Louis Samuel,	Fall of Schuylkill,	Pa.	J. T. White.
Sparks, Edgar Reed,	Philadelphia,	Pa.	W. E. Lee.
Stanger, Lawrence Albertson,	Frankford,	Pa.	C. A. Roberts.
Stanton, Thomas Jefferson,	Chester,	Pa.	R. H. Henderson.
Stedem, Lawrence Sylvester	Aloysius, Logan,	O.	F. W. E. Stedem.
Steele, John Wesley,	Easton,	Pa.	G. J. Pechin.
Stem, Harvey Nevin,	Stemton,	Pa.	L. C. Funk.
Stewart, John,	Philadelphia,	Pa.	Eberly Brothers.
Stiles, Wm. Hubert,	Camden,	N. J.	E. C. Jones.
Sultzbach, Harry Miller,	Marietta,	Pa.	Dr. J. F. Meade.
Sutton, Samuel,	Wilkesbarre,	Pa.	W. D. White & Co.
Taggart, Geo. Corson,	Norristown,	Pa.	H. R. Giffin.
Taylor, Harry Baker,	Altoona,	Pa.	E. S. Taylor.
Taylor, Howard Davis,	Smyrna,	Del.	N. Davis.
Taylor, Merle Hampton,	Butler,	Pa.	J. H. Parks.
Terne, Henry Bruno,	Philadelphia,	Pa.	Bullock & Crenshaw.
Thompson, Jos. Brinton,	Cochranville,	Pa.	Dr. Henderson.
Tragesser, Edward Charles,	Lancaster,	Pa.	Dr. J. Long.
Troop, Wm. Winebert,	Reading,	Pa.	C. M. Steinmetz.
Trump, Thaddeus Thomas,	Canton,	O.	Weber Brothers.
Turner, Philip Percy,	Millington,	Md.	H. Diefenbeck.
Ueberroth, Harvey Milton,	Bethlehem,	Pa.	Paul Kempsmith.
Umstead, Walter Horace,	Salem,	O.	Bolger & French.
Van Buskirk, Thomas Franklin,	Bethlehem,	Pa.	Dr. S. L. VanBuskirk.
Van Dyke, Albert Nelson,	Philadelphia,	Pa.	F. P. Lins.
Voss, Frederick J.,	Borgloh,	Germany,	Dr. Usilton.
Wahle, Edwin,	Davenport,	Ia.	T. H. Busch.
Walter, Andrew Wendel,	Philadelphia,	Pa.	J. B. Ferguson.
Walton, Harry Hurley,	Philadelphia,	Pa.	W. H. Lacey.
Walls, John Henry,	Media,	Pa.	A. Roidot.
Walz, Frank James,	Harrisburg,	Pa.	Dr. M. F. Raysor.
Weisner, Nicholas Frederick,	Leesport,	Pa.	L. A. Podolski.
Westcott, Frank,	Media,	Pa.	W. E. Dickeson.
Westphal, Carl Henry,	Hamburg,	Germany,	E. Graff.
Whilt, John Henry,	Philadelphia,	Pa.	Dr. I. R. Landis.
White, Charles H.	Titusville,	Pa.	G. B. Evans.
White, Preston Barnes,	Chambersburg,	Pa.	C. H. Cressler.
Wier, Jr., Thos. Jefferson,	Annapolis,	Md.	N. B. Danforth.
Wilkinson, Howard Marion,	Camden,	Del.	F. H. Davis.
Wilkinson, Richard Powers,	Philadelphia,	Pa.	F. Bowker.
Williams, Chas. Morgan,	Lambertville,	N. J.	F. C. Lehman.
Williams, Clarence Edward,	Philadelphia,	Pa.	Bullock & Crenshaw.
Williams, Harry,	Laurel,	Del.	Dr. A. W. Duvall.
Winch, Howard Geo.	Bethlehem,	Pa.	H. L. Barber.
Wingert, Wm. Harry Kitzmiller,	Knoxville,	Tenn.	G. A. Wingert.
Wittel, John Kaler,	Florin,	Pa.	L. Seipel.
Woertz, Geo. Augustus,	Philadelphia,	Pa.	W. A. Auffurth.
Wohlgemuth, Julius,	Philadelphia,	Pa.	G. D. Borton.
Wollmuth, Richard Julius,	Bethlehem,	Pa.	C. H. Tatem.
Yohn, Charles Ragan,	Hagerstown,	Md.	J. H. Munson.
Zimmerman, Howard,	Mt. Carmel,	Pa.	E. W. Sharp.

THE AMERICAN JOURNAL OF PHARMACY.

FEBRUARY, 1892.

ANALYSES OF SOME INDIGENOUS DRUGS.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy,
No. 102.

Louis H. Koch examined two samples of *Taraxacum officinale*, one of the root as he found it in commerce, the other of the root collected by himself in March, at Leetonia, Ohio. The commercial sample yielded 15.60 per cent., and the other 5.20 per cent. of inulin. The former was also submitted to a proximate analysis, and, while no new principles were obtained, the following percentages of the compounds already known to exist in it, besides the inulin, may be of interest:

	Per Cent.
Moisture	7.95
Ash	22.50
Volatile matter at 110°. . . . .	.02
Fat . . . . .	.44
Wax . . . . .	.09
Caoutchouc . . . . .	.10
Resin soluble in ether . . . . .	.35
Resin insoluble in ether . . . . .	.22
Mucilage	8.49
Saccharose	1.08
Glucose . . . . .	.46
Albuminoids	4.89

The taraxacin was separated by dissolving the alcoholic extract in water and agitating with chloroform. The amount was not determined.

William Pfeuffer submitted the over-ground portion of *Balmoney* to a proximate analysis and detected the presence of a glucoside in

the ethereal and alcoholic extracts. The peculiar disagreeable odor evolved by the decomposition of this glucoside was noticed throughout the analysis.

There were also obtained the following percentages of the usual plant constituents :

	Per Cent.
Moisture	8.43
Ash	7.55
Wax melting at 45°	1.57
Resin soluble in ether	1.50
Mucilage	2.72
Dextrin . . . . .	.96
Saccharose	8.00
Glucose	4.50
Albuminoids . . . . .	.96
Calcium oxalate	2.76

Crystals giving the reactions of gallic acid were obtained from the ethereal extract, and the aqueous solution of the alcoholic extract gave a dark color with ferric chloride, but the presence of tannin could not be satisfactorily demonstrated by gelatin.

Charles A. Ridgway investigated *Glechoma hederacea*, which he collected himself. It is more widely-known by the names of Gill-go-over the ground, or cat-foot.

A native of Europe, it has become naturalized in the United States, where it grows around old buildings, fence corners and other neglected places. The plant remains green the year around, but the stalks are more erect and the leaves larger during the warm weather, especially during the flowering period from May to September.

The use of the plant is confined to domestic practice, where it is used in the form of a cold infusion made by beating some of it with sufficient cold water to cover, and straining by expression. This is given in tablespoonful doses, and is considered to be of service in allaying fever and nausea. Pectoral, anthelmintic, tonic and diuretic properties are also ascribed to the drug. No unusual plant constituents were found in the course of a proximate analysis. The following percentages were obtained :

	Per Cent.
Volatile oil . . . . .	.06
Acrid fat melting at 53° . . . . .	.96
Caoutchouc . . . . .	.38
Wax . . . . .	.66

	<i>Per Cent.</i>
Resin and chlorophyll	2'00
Resin soluble in alcohol	2'41
Glucose	2'49
Saccharose	'40
Mucilage	5'18
Tannin	2'64
Albuminoids	4'08
Moisture	6'16
Ash	15'90

In experiments on the manufacture of the fluid extract, the best results were obtained by a menstruum of two parts alcohol to one of water.

AN ANALYSIS OF TRILLIUM.

BY VIVIAN I. REID.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.
No. 101.

Read at the Pharmaceutical Meeting, January 19.

Trillium, or beth-root, birth-root and wake-robin, as it is called, is an herbaceous plant belonging to the natural order of liliaceæ, and is indigenous to the United States, being found in damp woods. The rhizome is the part of the plant employed medicinally, and is sub-globular, or obconical in shape, about $1\frac{1}{2}$ inches long and from $\frac{1}{2}$ to $\frac{3}{4}$ inch in thickness; it is annulate, of an orange-brown color and has numerous light-brown rootlets. Upon transverse section the rhizome presents a mealy appearance, with the fibro-vascular bundles arranged in a circle or wavy line near the circumference. When moistened with tincture of iodine, it turns to a dark-blue color. It is inodorous, the taste astringent and bitter.

Its medicinal properties are emmenagogue and emetic. The American aborigines used this plant, and it has been employed as a poultice for tumors and ulcers in domestic practice. Boiled with milk it is said to be beneficial in the treatment of diarrhœa and dysentery.

The first notice of its medicinal properties was published in Henry's Herbal, in 1812. In the year 1820, Dr. S. W. Williams published an interesting article relating to the value of the different species of trillium, in the New England Journal of Medicine and Surgery, and later, another in the New York Journal of Medicine, volume viii, page 94.

The drug was first examined by Professor E. S. Wayne, of Cincinnati, in the year 1856, who noticed its peculiar acrid taste which somewhat resembled that of senega. Upon analysis the acrid principle was found not to be precipitated by lead acetates. However, a white amorphous powder was obtained by pouring a concentrated tincture into water, filtering, removing pectinous substances and setting aside 24 hours when it gelatinized. It was next filtered and dried. This principle resembled saponin; had the property of frothing when a small quantity was shaken with water, and was called trillin. The result of this analysis was published in the *American Journal of Pharmacy*, volume xxviii, page 512.

In my investigation, a quantity of the drug was obtained from a reliable source and percolated with 95 per cent. alcohol until exhausted. The alcohol was removed by distillation and the concentrated tincture poured into acidulated water containing $\frac{1}{2}$ per cent. of hydrochloric acid. After standing, it was filtered to remove the fat and oily resinous matter which had been precipitated. The filtrate was tested for tannic acid by use of ferric chloride, and the decoction for starch by use of iodine, their presence being determined. The remaining filtrate was shaken successively with petroleum ether, ether and chloroform. The petroleum ether extract consisted of resin which had not been precipitated by water.

The ether extract was dissolved in water; this solution shaken with ether, the ether decanted and allowed to evaporate. It was again dissolved in ether, and on evaporation left a crystalline residue, which was acid to litmus paper and gave no reaction with ferric chloride. A portion of this crystalline principle was dissolved in water, saturated with barium carbonate, filtered and set aside to evaporate. As a result, a crystalline residue was obtained which, upon being dissolved in water, gave tests for barium. It was also tested and found not to consist of a chloride. A second portion was treated with a drop of strong sulphuric acid, and gave a purplish-brown color which, on the addition of a crystal of potassium bichromate, turned to a light green color. A third portion was treated with strong nitric acid and dissolved, but gave no color.

Owing to the presence of a substance which tended to emulsify with the solvents, only a small quantity of the chloroform extract was obtained, and consisted of gummy principles. The solution was again shaken with petroleum ether to remove the remaining

chloroform, then made alkaline and shaken successively with petroleum ether, ether and chloroform, but on account of this substance forming an emulsion with all of the solvents, the nature of the substances removed by them could not be determined. On examination of the original precipitate, obtained by pouring the concentrated tincture into acidulated water, it was found to be slightly acrid. A portion was treated with ether and the ether after filtering allowed to evaporate. From the residue the same color tests were received as with the previous acid crystalline principle, thus showing that there still remained some of this principle in the precipitate.

As the drug contained a considerable quantity of this substance, which in every particular resembled saponin, a special determination was made by the usual method of estimating that principle. By treating ten grams of the powdered drug with hot water three successive times and straining, a decoction was made. This was precipitated with alcohol, filtered, and the precipitate treated with hot 80 per cent. alcohol, and this added to the filtrate; the alcohol recovered and the residue dissolved in water, concentrated, and precipitated with baryta-water; the precipitate collected, dried at 110°C. and weighed as saponin baryta, the amount being 0.580 gram. This was ignited and weighed as barium carbonate; calculated into the oxide which gave 0.094 gram and this subtracted from 0.580 gram or the amount of saponin-baryta; giving the amount of saponin as 0.486 gram or 4.86 per cent.

From this analysis it is believed that beside the usual plant constituents such as starch, tannin, fat, resin and gum, trillium contains a small quantity of fixed oil, saponin to the extent of 4.86 per cent. and an acid crystalline principle which is colored purplish-brown by sulphuric acid, and light green with sulphuric acid and a crystal of potassium bichromate. It is suggested that this acid principle results from a decomposition of the saponin.

PURSHIA TRIDENTATA, D. C.

BY HENRY TRIMBLE.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy,
No. 100.

Read at the Pharmaceutical Meeting, January 19.

A description of this plant may be found in this Journal, 1891, page 524.

An additional quantity of the seeds has since been received from Dr. Havard, and examined with the following results:

The dry husk-like coverings of the seeds were removed and the latter powdered. Moisture was found to be 11.17 per cent., and ash 2.41 per cent.

Petroleum ether dissolved 6.83 per cent. of an oily substance of a pale amber color and oily taste. It was soluble in hot absolute alcohol, and this solution deposited granular wax on cooling. The cold alcoholic solution contained a saponifiable fat.

Stronger ether removed 1.43 per cent. of a yellow, granular, bitter substance from the seeds. The bitter principle was removed by dissolving as much as possible of this ether extract in water, acidulated with sulphuric acid and agitating this aqueous solution with ether. On evaporation of this latter solvent the bitter principle was left in a crystalline condition in fern-like forms on the bottom and in needles on the sides of the vessel. It is evidently a neutral principle, since it gave no reactions for alkaloids with Mayer's reagent, potassium tri-iodide, gold chloride, picric or tannic acid; an aqueous solution gave a dark green color with ferric chloride, no precipitate with lead acetate and a yellow precipitate with lead oxy-acetate soluble in acetic acid.

That portion of the ether extract insoluble in water was soluble in 95 per cent. alcohol and consisted of resin.

After the action of the two preceding solvents, absolute alcohol extracted 31.14 per cent. The solution was red in color, and upon distilling off the solvent a porous brown residue remained. On treating this residue with water, a solution was obtained which had a reddish color, acid reaction, bitter taste, and a peculiar odor.

This aqueous solution contained 12.03 per cent. of tannin (estimated by gelatin and alum), and 1.08 per cent. of glucose. The tannin was ironbluing. That portion of the alcoholic extract insoluble in water was red in color, soluble in 95 per cent. alcohol, giving a blood-red colored solution, which was precipitated by pouring into water, gave a brown precipitate with alcoholic lead acetate and a purple color with alcoholic ferric chloride.

Water removed from the residual seeds 15.43 per cent. of a faintly bitter substance. 9.72 per cent. were found to be tannin, 1.43 per cent. mucilage, and 1.62 per cent. glucose.

Dilute alkali extracted 16.00 per cent. of pectin and albuminoids and 0.43 per cent. of extractin.

Dilute acid removed 2.21 per cent. consisting of pararabin and the phosphates of calcium and magnesium. The residue yielded 4.55 per cent. of starch, leaving a residue of lignin and cellulose of 8.40 per cent.

The husks of the seeds were found to have a bitter taste, and a quantity exhausted with alcohol, the solvent recovered, the residue dissolved in acidulated water and agitated with ether, yielded on evaporation of the last solvent some of the same bitter principle obtained from the seeds.

ON COMMERCIAL EXTRACT OF VANILLA.

BY F. W. HAUSSMANN, PH.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Jan. 19.

The subject of vanillin and commercial vanilla extracts, being dwelled upon at several previous meetings, it may, perhaps, be of interest to consider the same from a commercial standpoint. Very few articles, in as active demand as this extract, show such a variety of composition, as almost every druggist has a different formula. It may be questioned if many pharmacists sell the preparation of the pharmacopœia for flavoring purposes.

At the present day a good quality of vanilla bean cannot be bought under \$7 or \$8 per pound, and, calculating on this basis, the price of one pint of Tinctura Vanillæ, U. S. P., comes to little less than \$1. To sell over the counter and obtain a reasonable profit would compel the pharmacist to demand for this extract at least 10 cents per ounce, which, with the prominence of the "grocery, store" vanilla, is almost impossible. The consumer, as a general rule, is but a poor judge of flavoring extracts, quantity and not quality being the main factors in purchasing. To meet this competition, either the amount of vanilla is decreased or a cheaper tonka or a similar substitution is made. That these substitutions do not replace the agreeable vanilla flavor is a well-known fact.

The National Formulary gives a receipt for a compound tincture of vanillin, a colored, weak alcoholic solution of vanillin with the admixture of a small amount of coumarin. Its cost is rather less than the pharmacopœial tincture. The amount of vanillin in it is however, excessive; less than half the amount given would be sufficient for a preparation intended for counter sale.

The practice is said to be in use to employ a certain amount of the vanilla bean in the preparation of an extract and making a subsequent addition of vanillin. This addition will give the finished preparation an agreeable flavor, and it is possible that the better quality of commercial vanilla extracts are made in this way.

To what extent this takes place is not possible to tell. Incidentally may be mentioned that the sale of this and most other flavoring extracts has passed beyond the limits of pharmacy and into the hands of grocers and provision dealers.

PERCENTAGES IN SOLUTIONS.

BY JOSEPH W. ENGLAND, PH.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Jan. 19.

Concerning the subject of percentages in solutions, a sharp distinction should always be made between percentage by weight and percentage by volume. They are by no means identical. In the former the proportions are all by weight, in the latter the solids are by weight, and the liquids by volume. Where the term percentage alone is used, it is always understood to be percentage by weight. Where percentage by volume is meant, it is always so expressed.

Now concerning percentage or percentage by weight. The matter of mixing one liquid with another is merely a question of relative proportions. It is in the dissolving of a solid or solids in a liquid, where difficulties arise, especially where it is desired to ascertain the quantity necessary for a fluidounce, or a pint, etc., of a certain per cent. solution.

In the majority of instances the solvent used is water, the weight of each fluidounce being 455.7 grains, and of each pint 7,291 grains. Suppose, for example, that one wishes to make a fluidounce of a 10 per cent. cocaine solution, then we would make 45.57 grains, the weight of a fluidounce of water, 90 per cent., and ascertain the 10 per cent. of cocaine by simple proportion, as follows:

$$90:10::455.7:50.6 \text{ grains.}$$

In other words, 50.6 grains of the salt dissolved in one fluidounce of water would give a 10 per cent. solution, slightly excess in volume, to a fluidounce, according to the increase of volume resulting from the dissolved salt. Another method may be followed. Mul-

multiply 455.7 by the percentage desired, to obtain the quantity in grains of the solid, dissolve in a small quantity of the solvent, and then add sufficient water to make the whole *weigh* 455.7 grains. In this case, also, the volume will be slightly less than a fluidounce.

When it is stated that each solid, on solution, displaces a different volume of the solvent according to the solid dissolved, it will be seen that to obtain *exactly* a fluidounce or a pint of a certain per cent. solution of a compound, there must be taken into consideration the relative expansion in volume of each solid; and each solid is a law unto itself. Hence, it is more practical to take the weight of a fluidounce or a pint of the solvent, as 100 per cent. minus the per cent. solution desired, as a basis, and work out the quantity desired by simple proportion, ignoring the increase in volume, which of necessity must be an ever variable factor, according to the compound dissolved. Say, for example, that one wishes to make a $\frac{1}{1000}$ or a $\frac{1}{1500}$ or a $\frac{1}{2000}$ solution of bichloride of mercury, the readiest method is to divide 7,291 by 1,000, 1,500 or 2,000 to obtain the number of grains per pint, and then add sufficient water to make the product weigh 7,291 grains. In this connection it may be of value to state that it is never necessary to use alcohol in making the familiar 1 : 8 bichloride of mercury solution when ammonium chloride is also ordered, as water alone is sufficient to dissolve mercuric chloride under these conditions. In the absence of the ammonium salt, however, alcohol is essential for solution.

Concerning the 1 : 20, 1 : 40, or 1 : 60 carbolic acid solutions, these terms may either be reduced to a percentage first, and the proper quantity of the acid per pint obtained by multiplying 7,291 by the percentage, or 7,291 may be divided by 20, 40 or 60, as the case may be, to obtain the number of grains per pint—in both cases, however, making up to 7,291 grains in weight by the addition of water. If a gallon of the solution be wished, it is scarcely needful to say, that the quantity should be multiplied by eight, and the number of grains, for convenience sake, reduced either to troy ounces by dividing by 480, or to avoirdupois ounces by dividing by 437.5.

When it becomes necessary to use a liquid other than water as the solvent, a seeming difficulty arises, but it is one which is easily overcome. In such a case, first determine the weight in grains of a fluidounce or of a pint of the dissolving liquid by multiplying

455.7, or 7,291, by its specific gravity, and the product will be the weight desired. Say, for example, that the weight of a fluidounce of alcohol is required; the specific gravity of alcohol at the common temperature is 0.820, and 455.7 multiplied by this will give the desired weight. If chloroform is used we multiply by 1.485, or if stronger ether, by 0.725. Where extreme accuracy is required it becomes essential to first ascertain the specific gravity of the solvent at a temperature taken at the time of solution, and then deduce the weight of a fluidounce as above. This, however, is rarely necessary, and for every-day practical purposes is not essential.

THE BUSINESS ASPECTS OF PHARMACY.

BY JOSEPH HARROP, PH.G.

Read before the Philadelphia College of Pharmacy at the Pharmaceutical Meeting,
January 19.

The outlook of the business of the pharmacist is a common topic of discussion in these days, and not without good cause; indeed the subject is a pressing one, and proofs of this fact meet us on every hand. From the distant Pacific slope comes published word of the ill condition of the calling in the cradle of Pharmacy in the Atlantic States, and from every section of our country can be heard spasmodic wails of anguish telling of wrongs endured.

The dilemma is intensified by the diverting from its original and natural channel of the sale of the great illegitimates—the proprietary class of goods, which aforetime did much to add to the general prosperity of the average druggist. This, however, while the most talked-of, is only one of many reasons for the general commotion now taking hold of the former complacent and commonly prosperous apothecary, which prosperous condition has become sadly changed in these latter days; and the end is not yet.

The leading professional journals in the calling are lending their aid in efforts to define the cause and find the cure. The remedy in this particular ailment is as plain and easy as the most simple business problem that could present itself. It will solve itself, and is being solved, by the only natural and possible means, namely, a proprietor of an exclusive and proprietary article has the power to regulate its manufacture and sale, and to enforce his conditions, or

he can withhold its sale in any given location or to any individual. Further, every honest proprietor and manufacturer will see that this right is respected. If this element is not in him, or selfish ends only are perceptible to his defective mental vision, then the non-secret preparations of the individual dealer will compel him to respect those rights. So, sooner or later, the question will be solved.

As before remarked, this is only one of the many causes of the want of prosperity in our business. Specific medication, as introduced by the homœopathic representatives of the healing art, is responsible for many of our apparent ills. (I say apparent, for we have lived long enough to have learned that many supposed ills are only blessings in disguise.) We would refer particularly to one result of that manner of prosecuting the practice of healing peculiar to this class.

Originally there were introduced pleasant potions in various forms, and then came pellets or little pills to suit the taste of the most fastidious. This form has captured the women and children en masse, and the adult males are fast falling into line. *Now come tablets*, and tablets have come to stay. They are only a return by a round-about way to the old confections of a century ago, but in an infinitely more presentable and palatable form. With tablets has come also the discomfiture of the apothecary.

Two causes affecting the business of the druggists of the day have been recounted. The first, as already remarked, will fully and in good time right itself from its extreme abuse. The second will, to my mind, from its medium of application—the physician—open up a wider and deeper cause for complaints from the present-day apothecary. For the compact, pleasant and portable form of tablets will make it possible to readily place in the patient's hands remedies which will replace at once powders and pellets; and now that the day of elixirs is well past its meridian, it will replace also, to a degree, every known form of medication.

The business of the apothecary is, without doubt, undergoing a transformation which, in its ultimate extent, is but poorly comprehended at this time. I fully believe that within another quarter of a century the business of the druggist will be as distinct from that of the true pharmacist, as was that of the herb dealer of a half century ago from the old-time apothecary.

Legislation has scarcely taken its first step forward. Not all the States have even yet a form of law regulating the practice of Pharmacy, and when the next step is taken, and the next, there will be seen, coming to the front, wafted on breezes from the older and better regulated communities of the old world, a protection long needed, and even now formed in the minds of the thinking men of the profession—a protection to legitimate Pharmacy. It is as sure to come as La Grippe or dengue, for ideas spread faster and lay hold of the people more surely than disease. The inevitable is being forced upon us. The light from the rising sun of a better day is already being seen in the Eastern horizon.

Columbus, O.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

ACTION OF BORAX ON CHLORAL.—Mr. Dujardin (*Bullet. Commerc.*, April, 1891) found that in preparing solutions containing borax and chloral, considerable depends on the temperature at which the compounds are brought together. At ordinary temperatures no change is observed; on warming, however, decomposition of the chloral takes place, a long-continued, slightly elevated temperature decomposing the chloral as effectually as a few minutes boiling. The decomposition in this case seems to be similar to that which takes place when an alkaline hydrate is used; at least chloroform is one of the decomposition products. In dispensing the two substances it is recommended to dissolve the borax, if necessary, by heat, and allow the solution to cool before adding the chloral.

BISMUTH SALICYLATE.—Duyk (*Bull. Soc. Pharm. Bruxelles*, Oct., 1891) proposes the following method for the preparation of bismuth salicylate: 100 gm. subnitrate of bismuth are treated for one or two days with one litre of water, to which 50 gm. water of ammonia had been added. After shaking sufficiently the subnitrate is completely changed into an oxide, which is collected and carefully washed with water. This oxide, after expression, is heated, under constant stirring, with 25 gm. powdered salicylic acid on a water-bath. When union has been effected, which is found by using litmus paper, the salicylate of bismuth is washed and then dried at a slightly elevated temperature. (See also *Amer. Jour. Phar.*, 1891, p. 401.)

NEW REAGENTS FOR COPPER SALTS.—*Le Moniteur de la Pharmacie* (1891, 1006) states that pyrogallic acid and a cold solution of neutral sulphate of sodium yield with small quantities of copper salts a blood red color. 1 cc. of a solution of copper sulphate, $\frac{1}{3000000}$, still shows the reaction.

Mr. Denigés evaporates the solution to be analyzed, to dryness, and adds to the calcined residue one drop of a 5 per cent. solution of bromide of potassium. The mixture is again evaporated to dryness when, if copper be present, a characteristic violet zone of anhydrous copper bromide appears.

REAGENT FOR TANNIN.—Baemes (*Monit. de la Pharm.*, 1891, 1006) uses as a reagent for tannin a solution containing in 10 cc., 1 gm. sodium tungstate and 2 gm. sodium acetate. This yields with tannin in acid or alkaline solution a straw-colored precipitate which is insoluble in water. The reaction is said to be very sensitive.

REACTION OF SALOL.—According to *Journal de Pharmacie d'Anvers*, the following is a characteristic reaction of salol. A small quantity of salol is added to a few drops of nitrosulphuric acid. The mixture is colored yellow and on stirring with a glass rod it changes to brown and then to green. On diluting with about 50 gm. of water the liquid assumes a rose color, the green color reappearing on adding ammonia. Resorcin treated in the same manner gives a deep blue color; on dilution, red. In the latter solution, ammonia causes the blue color to reappear.

A NEW INTESTINAL ANTISEPTIC.—Yvon and Berlioz (*Jour. Pharm. Chim.*, 1891, 479) use in place of the β -naphtholsalicylate the β -naphtholbenzoate or *benzonaphthol*. This is prepared by heating 250 gm. powdered β -naphthol and 270 gm. pure benzoylchloride on a sand bath slowly to 125° C. and then for half an hour to 170° C. After cooling, the congealed mass is crystallized twice from 8 to 10 times its weight of boiling 90 per cent. alcohol. The β -naphthol can also be separated by heating the mass with dilute sodium hydrate (20 gm. solution of sodium hydrate to 1 litre of water) for 20 minutes to 50 or 60° C. and then washing until the product gives no blue coloration with potassium hydrate and chloroform. Benzonaphthol is almost insoluble in water, more soluble in alcohol and easily in chloroform; its fusing point is at 110° C. The tests for its purity are as follows: (1) A blue color must not appear when a

small piece of potassium hydrate is added to a boiling solution of benzonaphthol in alcohol-free chloroform. (2) An alcoholic solution of benzonaphthol to which an equal volume of nitric acid has been added, must not become cherry red in color on addition of a few drops of acid mercuric nitrate solution.

β -IODONAPHTHOL, A NEW ARISTOL.—G. Braille (*L'Union pharmaceut.*, 1891, 437) gives the following directions for the preparation of this body: A solution of 24 gm. iodine and 27 gm. potassium iodide in water is added to a solution containing 110 gm. β -naphthol and 40 gm. potassium hydrate. To this mixture is gradually added a solution of sodium hypochlorite containing 10 times its volume of combined chlorine. β -iodonaphthol separates in the form of a green-yellow pulverulent precipitate, which is washed several times and then dried. It is odorless and tasteless, insoluble in water, partially soluble in alcohol and acetic acid. On exposure to light the body is quickly darkened.

FERRATED COD-LIVER OIL.—*Bulletin de la Société de Pharmacie*, Bordeaux, 1891, 341, gives the following formula for this preparation. Cod-liver oil 2,000 gm.; alcohol 90 per cent., 1,500 gm. and caustic potash 3,300 gm., are heated until saponification has taken place; then while warm the mass is mixed with perchloride of iron, 2,700 gm., in distilled water, 5,000 gm. The iron soap separates as a brown mass, is washed with water and then heated to drive out the water. Lastly it is dissolved with the aid of heat in five times the quantity of cod-liver oil. The finished product, weighing 2,700 gm., is set aside to settle and is then filtered

QUINETHYLINE has been prepared by E. Grimaux and A. Arnaud (*Compt. rend.* 112, 1364) by heating in sealed tubes at 95–100° C. cupreine dissolved in alcohol, with sodium and ethyl nitrate. The dry base melts at 160° C., is very soluble in all ordinary solvents for alkaloids and yields very fluorescent solutions with excess of sulphuric acid. The normal sulphate crystallizes in colorless efflorescing prisms, dissolves in 51 parts of water at 19° C., and with hydriodic acid and iodine yields garnet-red needles, unlike the plates of herapathite given by quinine. The new base is the ethyl-ether of cupreine, while quinine is the corresponding methyl-ether. (See *Amer. Jour. Phar.*, 1891, p. 350.)

GALLIC ACID, when heated for several hours to 60° C., with zinc powder and ammonia solution, is converted into benzoic acid, according to C. E. Guignet (*Compt. rend.*, 113, 200). The same result is produced by heating gallic acid with zinc and dilute sulphuric acid. Tannin treated in a similar manner, is first transformed into gallic acid, and yields finally benzoic acid.

KOLA NUT.—Monavon and Perrond have made comparative physiological experiments (*Lyon méd.*, 1891, No. 46), which lead them to the conclusion that caffeine is not the only tissue-economizing principle present, but that other compounds of kola nut likewise diminish tissue-waste. In this direction is the action of kola red, although it has only a slight effect upon the elimination of nitrogen compounds and phosphates. The extract of kola has the same effect as the powder.

VAPORS OF NAPHTHALIN are recommended as a remedy in whooping cough, by Chavernac (*Bull. gén. de Thér.*, Oct. 30, 1891). About 15 to 20 gm. of the compound are slowly vaporized from a porcelain dish, taking care that the naphthalin is not ignited, since the smoke is acrid and irritating. The vapors give prompt relief in the disease named, unless complicated with tubercular or emphysematous affections, when they are apt to cause distress.

ANTIPYRIN, in doses of 0.25 gm. every two hours, is recommended by Dr. Guibert of Montpellier (*Sem. méd.*, 1891, No. 34) for checking the secretion of milk; no unpleasant effects have been observed.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

The iodine-absorption of fixed oils.—In the Am. Journ. of Pharm., 1891, 484, the method proposed by Dr. Holde was published. In the Chemiker Zeitung 1891, p. 1791, Dr. W. Fahrion published an article upon the same subject which offers some very decided improvements over the method of Dr. Holde: These are (1) a simple, although not new method, for the standardization of the thiosulphate solution; (2) the excess of iodine solution is exactly stated; (3) the iodine solution is capable of being used even after standing for several months; and (4) that the determination for both drying and non-drying oils is identical.

The necessary reagents are as follows: Mercuric chloride solu-

tion, 60 grams in one liter 95 per cent. alcohol; iodine solution, 50 grams in one liter 95 per cent. alcohol; thiosulphate of sodium solution, 24 grams of the crystallized salt in one liter distilled water; potassium iodide solution, 10 per cent.; potassium bichromate solution, 3.874 grams pure, dry salt in one liter water; chloroform; dilute hydrochloric acid.

To standardize the thiosulphate solution—10 cc. potassium iodide solution, 5 cc. dilute hydrochloric acid, 20 cc. potassium bichromate solution and 150 cc. water are placed in a stoppered flask of 300 cc. capacity and well agitated; to the red solution which contains exactly 0.2 gm. free iodine, is added the thiosulphate solution from a burette until a faint bluish-green color due to the chromium salt results (the addition of starch is not necessary and besides is considered a source of error, as the albuminoids generally present in starch liberate iodine). One cc. thiosulphate solution corresponds generally to 12–14 mg. iodine; by keeping in well-stoppered bottles very little change in the strength of this solution takes place. *To standardize the iodine solution*—10 cc. each of the iodine and mercuric chloride solutions are placed in the flask, 20 cc. potassium iodide solution and 150 cc. water added; after thorough agitation the thiosulphate is added until the liquid becomes colorless. *The determination of the iodine-absorption* of the oil presupposes that the nature of the oil is known; if unknown, a preliminary determination must be made. 0.2–0.3 gram of the oil to be examined is weighed into the flask, dissolved in 20 cc. chloroform, a quantity of iodine solution added, which contains *four times as much iodine* as is likely to be absorbed, previously mixed with an equal volume of the mercuric chloride solution; in a second flask are placed the same quantities of chloroform, iodine and mercuric chloride solutions; after standing two hours the proper quantity of potassium iodide solution (for each gram iodine about four grams potassium iodide) and 50–100 cc. water are added, and the mixture titrated with the thiosulphate solution; the difference between the two represents the iodine absorbed by the oil. In the examination of olive oil which has an iodine-absorption of about 84 for one gram oil, 3.360 gm. iodine should be added; in the case of linseed oil, one gram requires 7.20 grams iodine to be added because 180 is the iodine-absorption figure.

To keep drugs, which are easily attacked by insects, R. Idelson.

sprays them with ether, and places them in a tightly stoppered glass container which has been rinsed with ether, and is then kept in a dark and cool place. This plan has been found very satisfactory in keeping raspberries, juniper-berries, taraxacum and parsley roots, etc.—*Pharm. Ztschr. f. Russl.*, 1891, 757.

Presence of metals in volatile oils. — A crystalline sediment, deposited by oil of cassia, was proven to be lead cinnamate; the oil being exported from China in lead-containers accounts for this. An examination of twelve samples of commercial oil of cassia revealed lead in all but one sample; the test is easily made by agitating a few drops of the oil with hydrogen sulphide water, when the globules of oil become red to black in color, depending upon the amount of lead present.

A sample of *sandal-wood oil* exported in a zinc-container was found to separate a sediment containing zinc. These observations lead to the recommendation that essential oils should be kept in glass vessels only.—E. Hirschsohn, *Pharm. Ztschr. f. Russl.*, 1891, 790.

Tumenol-preparations are recent dermal remedies; they are prepared from the mineral oils obtained in the distillation of bituminous slate; after agitating the oil first with sodium hydrate and then with sulphuric acid it is treated with fuming sulphuric acid; the dark syrupy liquid which separates is washed with water and salt solution, and then dissolved in sodium hydrate solution; from this solution ether extracts what is called *tumenol-oil* (an aromatic, syrupy liquid, soluble in ether, ligroin and benzol); by the addition of hydrochloric acid to the sodium hydrate solution *tumenol-sulphonic acid* is precipitated (a black, bitter, odorless powder soluble in water, but precipitated by addition of acids). A mixture of these two substances forms *tumenol-venale*, a soft, resinous, odorless mass. They have strong reducing actions and their effect is probably due to this; in this they differ notably from ichthyol which owes its action to the sulphur present. Tumenol-preparations are used either as lotions or as ointments containing 5–10 per cent. tumenol along with zinc oxide or bismuth subnitrate.—(*Deutsch. Med. Wochenschr.*) *Apoth. Ztg.*, 1891, 663.

Solutol is a new disinfectant containing in 100 cc., 60.4 grams cresol of which one-fourth is free, the other three-fourths in combination as sodium-cresol; it is claimed to combine the disinfecting action of cresol and sodium hydrate. It is generally used in 5 per cent.

solution. For outside use a crude solutol is offered which, however, owing to impurities of pyridine and hydrocarbons, has a disagreeable odor; for the disinfecting of rooms, etc., an odorless, pure solutol is manufactured. For surgical disinfection a neutral solution of cresol in sodium-cresol is sold under the name of *solveol*; used in one-half per cent. solution it is less poisonous than a phenol solution of equal efficacy (2-3, and in some cases 5 per cent.). It is miscible with any kind of water, forming a perfectly clear solution.—J. Reich, *Oesterr. Ztschr. f. Pharm.*, 1891, 694.

Hæmol and *Hæmogallol* are two preparations containing iron, which for easy assimilation far surpass any compound previously used; they were first prepared by Prof. Kobert by the action of reducing agents upon the blood-coloring matter; in the first-mentioned zinc-dust is used (a minute quantity of zinc is allowed to remain in this preparation as it exerts a favorable action in certain defects of the stomach and intestines): in the last mentioned, pyrogallol is used; the former is a dark brown, the latter a red brown powder. The dose ranges from 0.1-0.5 gm. three times a day; an agreeable form of administration was found in chocolate tablets, each representing a little over one milligram metallic iron, one to be taken fifteen minutes before meals. Patents have been applied for, for these two preparations.—*Oesterr. Ztschr. f. Pharm.*, 1891, 724.

Guaiacolum carbonicum is the latest of the patented guaiacol preparations; it is made by dissolving two molecules guaiacol in the proper quantity of sodium hydrate solution and then slowly passing carbonyl chloride (one molecule) through the solution; the precipitated carbonate is washed with soda and water and recrystallized from alcohol. It has the formula $\text{CO}(\text{OC}_6\text{H}_4\text{OCH}_3)_2$, is soluble in hot alcohol, ether, chloroform and benzol, insoluble in water and nearly so in cold alcohol; it forms an odorless and tasteless crystalline powder, melting at 85° C. It is easily saponified by alkalies and taken internally this change is produced in the intestines, the products formed being guaiacol and carbonic acid.—J. Reich, *Oesterr. Ztschr. f. Pharm.*, 1891, 725.

Aristolochin is the name given by Dr. J. Pohl to the active principle of the seeds of *Aristolochia Clematidis* and the roots of *A. rotunda* and *A. longa*. The powdered drugs were exhausted with petroleum-ether, which removed chlorophyll, oil and a gelatinous, nitro-

genous, inactive substance (occasionally this can be obtained crystalline); warm 96 per cent. alcohol removed the coloring and bitter principles; after evaporating to syrupy consistence it was taken up with water and acidulated with sulphuric acid, the precipitate collected, expressed, dried at 40° C., and extracted in a Soxhlet apparatus for some weeks with petroleum-ether until the last traces of the above-mentioned nitrogenous substance were removed and the residue exhausted with alcohol or ether; from this alcoholic or ethereal solution there separated after a time yellow crystalline masses which, recrystallized several times from ethereal solution, were found to constitute the active principle. It is soluble in chloroform, ether, acetone, phenol, acetic anhydride, aniline and alcohol; almost insoluble in cold water, slightly soluble in warm water; insoluble in petroleum-ether, benzol and carbon disulphide; alkalis and alkaline-earth hydrates dissolve it; from neutral or alkaline solutions it is precipitated by neutral and basic lead acetate, dialyzed iron, zinc sulphate, silver nitrate and a saturated solution of salt, but not by alum, copper sulphate and platinic chloride; it does not reduce Fehling's solution and does not react with Millon's reagent. Its ultimate analysis, C 59.98, H 3.54, N 4.32, O 32.16, leads to the formula $C_{32}H_{22}N_2O_{13}$. Physiologically it was found that cold-blooded animals were entirely indifferent to it; while in warm-blooded animals uræmic intoxication was produced; in this respect aristolochin is a much more powerful agent than any other substance; it resembles aloin in its action upon the kidneys, but is about ten times more poisonous—it is probable that given to man it may act as a cathartic.—(*Arch. f. exper. Pathol. u. Pharm.*) *Apoth. Ztg.*, 1891, 642.

Arsenical cod-liver oil, upon the request of a specialist in children's diseases, was prepared as follows: 0.5 gm. arsenious oxide was warmed with 20 grams absolute alcohol in a small flask; no solution took place until a small particle of potassium carbonate was added when the oxide immediately dissolved without dissolving the potassium carbonate; after filtering, the solution was added to 1,500 grams cod-liver oil and warmed on a water-bath until the alcohol was dissipated. The oil is perfectly transparent and holds the arsenious oxide in solution; 30 grams of the preparation contain 5 mg. arsenious oxide [this is not correct if the arsenious oxide be completely dissolved; 30 grams will then contain 10 mg.—F. X. M.] and can be given to children in doses of $\frac{1}{2}$ –1 teaspoonful.—A. Janssen, *Pharm. Ztg.*, 1891, 780.

New tests to detect vegetable oils in lard.—If one gram or 25 drops of a fixed oil be dissolved in 5 cc. chloroform in a test tube, 2 cc. phospho-molybdic acid or sodium phosphomolybdate solution and a few drops of nitric acid added, there will be produced upon agitation an emerald green mixture; upon standing, two layers will separate, the lower chloroform solution being colorless, and the upper layer beautifully green. It is thought that the reaction is due to the vegetable oils containing minute quantities of alkaloids or glucosides which reduce the phosphomolybdic acid. The color is obtained with all these oils if they have not been chemically treated to remove acidity or color; in such cases the color may not be developed or only after some time. If the acid solution be super-saturated with an alkali or alkaline carbonate, the green color changes to a blue, the intensity of which corresponds to the green color. Mineral and animal fats (paraffin, vaselin, lard, etc.) excepting cod-liver oil, will *not* give the green color. To test lard for such adulteration one gram is dissolved in chloroform and then proceeded with as mentioned. Another test for fixed oils which is serviceable in detecting cotton-seed oil in lard, is to add to the lard a cold saturated solution of picric acid in ether and allow the solvent to slowly evaporate; pure lard will then show a lemon-yellow color, whereas, admixed with cotton-seed oil, it will have a brown-red color; pure cotton-seed or other fixed oil will become brown. Phospho-tungstic acid will also suffer reduction through the fixed oils, especially cotton-seed oil and cod-liver oil; in this case there is produced a violet coloration which on addition of excess of alkali (ammonia) changes to a beautiful blue, but the colorations with this reagent are not as permanent as with phosphomolybdic acid.—P. Welmans, *Pharm. Ztg.*, 1891, 798, and 1892, 22.

Salophen, or acetyl-p-amidosalol is a synthetic patented product used in cases of acute articular rheumatism in doses of four to six grams per day. It forms small, thin lamina, odorless and tasteless; almost insoluble in cold water, slightly soluble in boiling water, forming a neutral solution; more soluble in warm alcohol and ether; readily soluble in solutions of alkaline hydrates; it melts at 187–188° C. and contains about 51 per cent. salicylic acid. It is made by a complicated process and has the formula $C_6H_4(OH)COO C_6H_4NHCOCH_3$.—Dr. F. Goldmann, *Pharm. Ztg.*, 1891, 773.

MICRO-ORGANISMS IN PHARMACEUTICAL PREPARATIONS.

It is a matter of common knowledge that orange-flower water and other aromatic distilled waters are prone to become flocculent, to change in color and odor, and generally to become thoroughly objectionable. It is also well known that plain distilled water itself—that, for example, used in London for aerated waters—becomes ropy unless it be specially treated. So also certain saline solutions appear to undergo a change which, like these other cases, is supposed to be more or less microbic or vegetative. The phenomena have always had considerable interest to pharmacists and chemical investigators, and several in this country, as well as in France, Germany, and the United States have devoted special attention to it.

Considering that it is as far back as 1832 that Dr. B. Biasoletto, of Trieste, discovered and described the *hygrocrocis* fungus which infests aromatic waters, it would scarcely be excusable to refer to the matter now, were it not that Mr. H. Barnouvin, a distinguished French chemist, has recently published a useful epitome of his own investigations. He has given close attention to the subject for eight years, and is able to state that the micro-organisms which are found in distilled waters (*hydrolats*) are algæ, bacteria and fungi. These are not usually found associated together; in fact, the presence of one or other generally suffices to determine the condition of the water. The fungus commonly found in these media is the *Hygrocrocis hydrolatorum*. That and others more rarely found are characterized by the extraordinary shapes which they assume; they have no reproductive organs, simply conidiæ; at first they are of a pale color, but they gradually become black, thickish, and of great density, giving the waters a viscous appearance. These fungi are only developed if the hydrolates are acid at the moment of distillation. Bacteria are never found in that condition, but as the preparations change to neutrality they become abundantly charged with bacterial life. It sometimes happens that bacteria are present in large numbers in normally acid preparations, and when that is the case we have strong evidence that decomposition has advanced far. It is also noteworthy that bacteria are generally found in inodorous hydrolates, and fungi in the aromatic. The bacteria most commonly found in distilled waters are species of *Leptothrix* and *Micrococcus*. Barnou-

vin has found color-generating organisms in orange-flower and rose waters, but only when the preparations have been exposed to the light.

The presence of algæ is rarer than is generally credited, and when they are observed they are found to be species of *Protococcus*, *Hæmatococcus* and *Chlorococcus*. Light is essential for their production, especially in the case of green algæ; but these are seldom observed, the condition generally corresponding to advanced decomposition, the fluid having masses of shiny and blackish flocks of dead matter floating through it.

M. Barnouvin has extended his researches to the examination of the yellowish deposit which is formed by orange-flower water. This, as far as we can remember, has never been described, attention being solely directed to the filamentous growths in the water itself, which are composed of fungoid remains, spores of fungi, and the living plants. Examination of the yellow deposit with a high-power objective shows it to consist of free and united cells, yellow in color, globular in shape and immovable. They are apparently a true color-producing bacterium, and have, in a general way, the characteristics of *Micrococcus luteus*, Cohn. (*Bacteridium luteum*, Schröder.)

The existence of micro-organisms in certain saline solutions has been observed, and their nature more or less definitely determined by different observers. Marchand found, ten years ago, a peculiar fungus (*Hygrocrocis arsenicus*) in arsenical solutions, and a few years later Barnouvin published a list of solutions of salts in which similar fungi are found, the list including cocaine hydrochlorate, quinine hydrobromate, pilocarpine nitrate, etc. Purely inorganic substances—*e. g.*, potassium bromide and chlorate, boracic acid, and magnesium citrate, are equally liable to attack. In all these cases it is proved that the distilled water used in making the solutions already contains the germs or the young organisms, and the development corresponds with the nature of salt. The organisms are rarely green, and it has been noticed that the hygrocrocis develops in these solutions much less abundantly than in hydrolates, and that the organisms are frequently sterile. Bacteria only occur sporadically in such media, and algæ are also rarely found; but, strange to say, Barnouvin has found in Boudin's arsenical solution organisms shaped like a turnip, which show the presence of a true diatom of the tribe *Navicules*.

This is a branch of research which few pharmacists can take up, but, fortunately, the results so far obtained are sufficiently specific to permit a general rule to be drawn, which is, that in cases where solutions become infected with micro-organic life, the water used as the solvent is most probably the source of the infection. Not only should distilled water be boiled, but the containers for it should be frequently cleaned out thoroughly. There are many slight but annoying changes in pharmaceutical products which might be obviated by the exercise of more initial care to exclude micro-organisms.—The Chemist and Druggist, Jan. 2, 1892, p. 18.

INFLUENCE OF TEMPERATURE ON DIGESTIVE FERMENTS.¹

By E. BIERNACKI.

Digestive ferments require for their efficient action a certain reaction and a suitable temperature. The *optimum* temperature is 39–40°; that is, a little over that of the body. Higher temperatures destroy the ferment, and the present research is occupied with the determination of the temperature necessary for this latter purpose.

The first ferment investigated was trypsin, and it was found that 45° C. markedly lessens its activity, and exposure for five minutes to 50° destroys it altogether. The specimens of trypsin employed were some pure, some impure, and certain exceptions to the above-stated rule were noted. It being very improbable that various tryptins differ in this particular, in virtue of their inherent characters, experiments were instituted to determine the factor that caused the difference. It was found that small admixtures with certain salts had the power of increasing the resistance of the ferment to temperature; the activity of the ferment was often lessened by the salt (although this was more marked in the case of pepsin), but the *optimum* temperature was 50°; 55° lessened, and 60° destroyed, the activity of the ferment. The salts which acted thus were ammonium sulphate (a salt used in the preparation of some specimens of ferment used in the preliminary experiments), ammonium chloride, phosphate and nitrate, and sodium chloride. If mixtures of two or more of these salts were used, the effect was more marked still.

Certain salts (ammonium carbonate and oxalate, magnesium

¹ *Zeit. Biol.*, **28**, 49–71; *Jour. Chem. Soc.*, 1891, p. 1271.

sulphate, sodium sulphate and phosphate), starch and sugar had no such action, but certain products of proteolytic activity (albumose, amphopeptone and antipeptone) act like the salts just enumerated. All the materials that act in this way increase the alkalinity of the digesting medium; minute doses of sodium hydroxide act in a precisely similar way, and the proposition is advanced that the whole of the phenomena are simply dependent on the reaction. Increase of alkalinity protects the ferment. It was found that increase of acidity (trypsin will act in an acid medium if salicylic acid be employed) acts in exactly the opposite way; in an acid medium, 33–35° is the *optimum* temperature; 40° hinders, and 45° destroys, the action of the ferment.

Pepsin was then investigated, and it was found that acidity acts towards this ferment precisely like alkalinity towards the tryptic ferment, the temperature necessary to destroy its activity rising from 65° to 70°. In a neutral medium, the temperature falls to 55°.

Unfiltered fresh saliva loses its diastatic properties at 75°, filtered saliva at 70°, diluted saliva at 60°, pure ptyalin at 70°, unless its solution is much diluted, when the necessary temperature sinks to 60°. The influence of salts, reaction, etc., is exactly the same in kind as with trypsin. In all cases, if the pure ferment be used, the influence of temperature and the influence of salts, etc., on the temperature are more easily observed than if the ferment be impure, as contained, for instance, in the digestive juice.

The explanation of these occurrences probably lies in the formation of loose compounds with the enzymes, analogous to the pepsin-hydrochloric acid of Schmidt and other authors.

COFFEE-LEAF TEA.

Mr. William Sowerby, the veteran and distinguished secretary of the Royal Botanical Gardens, has sent to the *British Medical Journal* a note on his recent pregnant suggestion for adding to the number of alkaloidal beverages by the introduction of *coffee-tea*. When walking in the Gardens of the Royal Botanic Society, Regent's Park, and noting the extent of the collection of living medicinal and economic plants of all climes and countries there brought together in one spot, it must have occurred to all of us how very small a number of plants, out of the vast store which Nature has provided, man has bound to his service, and the yet fewer he

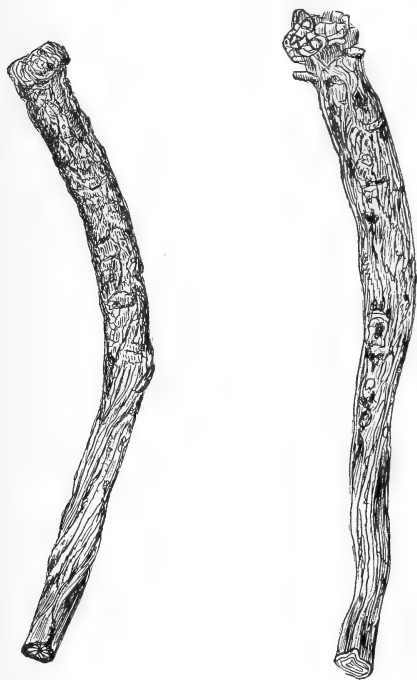
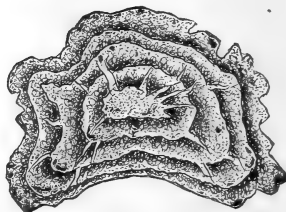
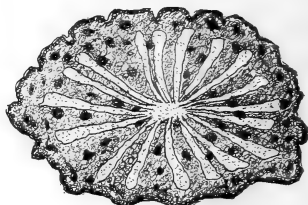
has taken the trouble to cultivate. During the march of the last half-century (in science, medicine, mechanics, steam and electricity) how little has been the gain from Nature's stores. The artificial culture of cinchona is, perhaps, the most noted of the few. Again, any step in eating, drinking, or dress, is so governed by habit or fashion that he must be a bold man who tries to turn the current. This is illustrated in tea drinking. Perhaps there is no one habit so universal; each people has its peculiar tea or closely allied beverage, and most of these have continued the same for many ages. In one it is cacao, in others coffee, and in many tea; in a few special quarters of the globe nothing but matê is thought fit to drink, but in only one small district is coffee-leaf tea used. Now we all know that these beverages are found by man to be pleasant and agreeable to him by reason of their containing a peculiar principle called theine; but yet we do not always select for our use the part of the plant containing the largest percentage of theine, or cultivate the special plant with a view to afford us the most valuable part. For example, in coffee the leaves are said to contain 1.26 of theine and the berries only 1.0 per cent., and yet over 110,000,000 of men use the berries and only 2,000,000 the leaves of coffee, although 500,000,000 use the leaves of tea. Now the cultivation of coffee berries is very trying, precarious, subject to attacks of blight and unfruitfulness—in fact it follows the general line that the produce of fruit by cultivation is far more open to accident than that of leaves, and very probably good crops of coffee leaves could be obtained at small cost in countries and localities where it would be risky or even impossible to produce berries. Here is a case open to a vast variety of peoples to solve, for there can be no reason why coffee leaves may not become a valuable item of culture in our warmer colonies and many parts of the world. The one most difficult item to move is to create the demand. Once start the fashion for "5 o'clock coffee-leaf tea," and the thing is done and many a fortune made. As to the peculiar flavor of coffee-leaf tea, much depends on the manipulation of the leaf after it is taken from the plant. At the Botanic Gardens a variety of flavors have by treatment been produced from leaves off of one plant, the general flavor being a kind of combination of coffee and tea so as to get both in one cup. This is much the same flavor as kola nut — Quart. Therap. Review, January, 1892.

FALSE PELLITORY ROOT.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society of Great Britain.

A few weeks since, a small sample of pellitory root (*Anacyclus Pyrethrum*) was forwarded to me by a wholesale herbalist in London, stating that it had been offered to the wholesale trade, but that there was some doubt as to its genuineness. The only feature noticeable at the first glance was the slightly paler color of some of

FIG. 1.—*Anacyclus Pyrethrum*.FIG. 2.—*Corrigiola telephiifolia*.FIG. 3.—Transverse section of the *Corrigiola telephiifolia*, magnified.FIG. 4.—Transverse section of *Anacyclus Pyrethrum*, magnified.

the pieces, but on cutting a transverse section and examining it under a lens, it was noticed that some of the specimens possessed a structure entirely different from that of pellitory, and that it was quite possible to distinguish the spurious root by this means. Some of the pieces, however, so closely resembled pellitory root in general appearance (Figs. 1 and 2) that they might easily be overlooked. It seemed desirable, therefore, to place on record the occurrence of the spurious root, and to point out the features by which it may be recognized.

The apex of the spurious root is generally crowned with small wart-like protuberances, such as frequently occur in senega root and in many of the *Caryophyllaceæ*; these are evidently the remains of the bases of slightly woody, slender stems. The transverse section of the root is of a yellowish-white color, with three to five pale opaque concentric rings (*Fig. 3*), each one alternating with a darker and narrower translucent horny ring.¹

The taste is sweetish at first, leaving after a time a slight tingling sensation, which recalls that of senega. The root possesses scarcely any odor. It is softer and more flexible than pellitory root.

In the root of *Anacyclus Pyrethrum* the structure is quite different.

The apex of the root is generally crowned with a tuft of short white hairs. The transverse section exhibits a single ring of radiating linear vascular bundles, which appears porous and of a yellowish color, the medullary rays and inner portion of the bark being of a creamy white tint, becoming much darker or of a pale brown hue in badly dried pieces. Scattered over the surface, but much more abundantly towards the circumference of the section, may be seen yellowish-brown oil receptacles, containing the odorous and resinous matters of the root (*Fig. 4*).

The identification of the root proved to be a matter of some difficulty, although its appearance seemed familiar to me. A section placed under the microscope showed no starch, nor did tincture of iodine manifest the presence of it.

Thinking, from its resemblance to dandelion root, that it might possibly belong to the *Compositæ*, it was examined for inulin, but without result, nor were laticiferous vessels observed in it, nor raphides.

I then sent a portion of it to Professor Radlkofer, of Munich, whose knowledge of the anatomy of the stems of plants is probably unequalled, asking him if he knew any plants of the natural order *Phytolaccaceæ* at all resembling it, for the roots bear a greater likeness to some species of *Phytolacca* than any other plant known to me. He was unable to identify it, but suggested a comparison with other known roots coming from the same district, if possible. Pel-

¹ In this character it recalls the appearance of dandelion root, but in that root the rings are interrupted, narrower and more spongy, and there is a well-marked woody centre of a yellow color and porous character.

litory root, being a native of northern Africa, it occurred to me that I had seen a root very like the spurious root in a collection of Morocco drugs presented some years ago by Dr. A. Leared (*Pharm. Journ.* [3], vol. v, p. 521). On examination of the roots in that collection it was found that the spurious pellitory was identical in appearance, structure and taste with the root called "towsergent" or "tauzarghente," which had been already identified by me as that of *Corrigiola telephiifolia*, Pour., belonging to the natural order *Illecebraceæ*. The fact that this little plant is glabrous, whilst *Anacyclus Pyrethrum* is hairy, explains the presence of the radical tuft of hairs on the apex of the one root and its absence from the other. Very little is known of the structure of the plants of the natural order *Illecebraceæ* or *Paronychiaceæ*, and that little refers chiefly to stems and not to root structure.

A brief account of the stem structure of *Corrigiola* is given in *Ann. des Sciences Nat.* ([4], tom. xiv, p. 117), but as pellitory root is rarely if ever used in a powdered state, and in an entire state the root of *Corrigiola telephiifolia* is easily identified, it is unnecessary to enter into histological details in the present note.—*Phar. Jour. and Trans.*, Nov. 21, 1891, p. 405.

THE BARK OF GONOLOBUS CONDURANGO.¹

BY G. CARRARA.

The bark is extracted with strong alcohol, and the filtered solution allowed to cool; a greenish powder (A) falls, leaving a yellowish-brown solution (B). On treating A with ether, it is divided into a soluble part (a), and a yellowish, insoluble powder (b); the latter is purified by dissolving it in boiling alcohol, allowing the solution to cool, and washing the deposit repeatedly with alcohol and ether. It proves to be a glucoside of the composition $C_{40}H_{74}O_6$, which melts at 112° , and is insoluble in ether and light petroleum, sparingly soluble in cold alcohol, and very slightly in water; the aqueous solution is not precipitated by potassium mercuric iodide, or by a solution of iodine and potassium iodide. When boiled for some hours with dilute sulphuric acid, the liquid reduces Fehling's solution.

The glucoside, when heated with benzoic chloride at 100° , forms a benzoyl derivative, $C_{40}H_{73}O_6Bz$; this can be purified by precipitation from its solution in chloroform by alcohol. It is a brownish-

¹ *Gazetta*, 21, 204-212; *Jour. Chem. Soc.*, 1891, 1387.

red powder, insoluble in alcohol, water, and light petroleum, very soluble in chloroform, but only sparingly in ether; it blackens at 250° , and melts with decomposition above 270° . On evaporating the mixture of alcohol and chloroform from which this compound is deposited, a white powder is left, which melts at 72° , and yields benzoic acid when boiled with potash solution; a sufficient quantity for complete examination could not be obtained.

The substance *a* is boiled with alcoholic potash, the alcohol evaporated, the residue taken up with water, and extracted with ether; on evaporation, a yellow powder is obtained, showing the color reactions of chloesterol, but melting at 52° and having the composition $C_{30}H_{50}O_2$; this compound the author names *conduransterin*.

The aqueous solution remaining after extraction of the *conduransterin* by ether contains cinnamic acid.

The original extract B has not yet been fully examined.

REPORT ON COMMERCIAL GOA POWDERS.

BY W. DUNCAN AND T. S. TWEEDIE.

Goa or Araroba powder, or poh'di bahia, or as it was called by Kemp, "chrysarobine," made its appearance in British pharmacy about sixteen years ago, and at that time Professor Attfield read a paper on its composition at an evening meeting of the Pharmaceutical Society in Edinburgh. The sample of the drug on which he worked was presented to him by Mr. D. Kemp, of Bombay. In that paper Professor Attfield (*Pharmaceutical Journal* [3], vol. v; *Am. Jour. Pharm.*, 1875, 330) states that he obtained from 80 to 84 per cent. of an active principle which he identified as chrysophanic acid. In a subsequent research by Liebermann and Seidler (*Ibid.* [3], vol. ix; *Amer. Jour. Phar.*, 1879, p. 80) it was shown that the active principle consisted essentially of a substance which by oxidation readily yielded chrysophanic acid, and to this they gave the name "chrysarobin." This title, of which we heard so much in 1885, when the present Pharmacopœia came out, is now by common consent confined to the purified article or so-called "chrysophanic acid" of commerce. The doubts on this point have been cleared up by the insertion in later reprints of the Pharmacopœia of the words, "as purified by solvents." This purified article has almost entirely taken the place of the crude drug, but from our own experience we have reason to

doubt if the purified article possesses the same activity as an equivalent quantity of the crude drug. This opinion is supported by the statement of Martindale ('Extra Pharmacopœia,' 6th edition, p. 108) that there remains in the mother liquor from which chrysarobin has crystallized, a substance more active than pure chrysarobin.

As already pointed out, Attfield found that Goa powder yielded from 80 to 84 per cent. of chrysarobin. Liebermann and Seidler put it at 66 per cent. and the United States Pharmacopœia at 54 per cent. For the last four or five years statements have appeared to the effect that the drug of the present time was much weaker than formerly, and contained less chrysarobin. This has been attributed to the Brazilians hewing down the tree (*Andira Araroba*) before it has reached maturity. It was while testing the value of this statement that the experiments, of which we now give the results, were undertaken.

Chrysarobin is readily extracted by hot benzol, but the difficulties of using that solvent in a Soxhlet apparatus, decided us to use chloroform, checking our results by ether. In the 'Extra Pharmacopœia' (p. 109) chrysarobin is said to be insoluble in ether. This, we find, is erroneous. It is soluble in ether, but we cannot agree with the U. S. Dispensatory (16th edition, p. 433) that it is readily soluble.

Ten commercial samples of Goa powder were examined. These

Sample.	Chrysarobin per cent.	Moisture per cent.	Insoluble matter p. c.
1,	76.90	2.10	21.00
2,	55.50	3.00	41.50
3,	80.80	2.60	16.60
4,	66.60	2.40	31.00
5,	81.80	2.20	16.00
6,	82.30	2.20	15.50
7,	57.20	3.30	39.50
8,	70.80	1.20	28.00
9,	68.85	2.90	28.25
10,	69.10	2.90	28.00
Average,	71.00	2.50	26.50

were obtained from different sources, in order that we might not have two of the same sample to examine. Four of these were in

an unpowdered condition and mixed with pieces of wood. The others were in powder of various degrees of fineness. All were reduced to the same powdered condition, interfering in no other way by removing the wood or otherwise. As a rule those samples which were in broken lumps and appeared most inferior, yielded the best results. We have brought the samples with us, and it will be seen that they vary very much in color.

The insoluble matter was not examined, but it appeared to consist mainly of woody tissue, and left a little ash on burning. From the above results it is evident that the statements as to the deficiency of commercial Goa powder at the present time are not well founded, but that the present supply compares favorably with the drug originally imported.—Phar. Jour. and Trans., January 2, 1892, p. 543.

ESTIMATION OF SUGAR AND TANNIN IN WINES.¹

BY J. H. VOGEL.

The author has proved by several experiments that it is absolutely necessary to first remove the tannin and coloring matters before attempting to estimate the sugars by Fehling's solution. 25 cc. of a 1 per cent. solution of tannin gave an amount of metallic copper corresponding with 0.91 per cent. of sugar. As the amount of tannin in Portuguese wines often is as high as 3 per cent., the importance of fully removing the tannin will be readily understood. After a short treatment with an insufficient amount of animal charcoal, the tannin is removed before the coloring matters are precipitated, and this fact enabled the author to prove that these coloring matters exercise a powerful reduction on Fehling's solution, as the yield of copper became greater as the solution was more colored. Their removal is best effected either with animal charcoal or basic lead acetate, but the author has made several important observations. As to the use of lead solution, 3 cc. is supposed to be sufficient for 60 cc. of Rhine wine, whilst for red wines the amount must be doubled. But in the case of Portuguese wines, this amount is far too small, and the author has met with a sample which required three times its bulk of *liquor plumbi* before it was completely decolorized. The excess of lead must be removed, according to Barth, by sodium carbonate, but the lead separates slowly, causing after-

¹ *Zeit. ang. Chem.*, 1891, 44-69; *Jour. Chem. Soc.*, 1891, p. 1557.

wards an increase in the weight of the copper precipitate, and unless the filtration has been very carefully effected, the sugar may come out from 0.2 to 2.2 per cent. too high, the error increasing with the amount of lead solution used. For wines rich in tannin and coloring matters, the charcoal process is the best. If, for this purpose, powdered purified animal charcoal is used, 25 grams of the charcoal will be found sufficient for 200 cc. of wine. The time the charcoal is allowed to act varies from 15 to 60 minutes, according to the amount of coloring matters present. A little sugar is also absorbed by the charcoal, but the author, who has thoroughly investigated the matter, finds the amount never to exceed 0.3 per cent. under the most unfavorable conditions. In some cases, it is advisable to first dilute the sample with a known volume of water before attempting to decolorize with the charcoal. The author next investigated the two chief processes used for the estimation of the tannin. It must be borne in mind that this acid, as it occurs in wines, is not at all a definite chemical compound, and is not identical with gallo-tannic acid. The percentage found by analysis is therefore not the true one, but only expresses its equivalent in gallo-tannic acid. The process which was found to answer best was that of Löwenthal. According to this method, the solution containing the tannin is largely diluted with water, mixed with a definite quantity of solution of indigo-carmin, containing sulphuric acid, and then titrated with a weak solution of potassium permanganate. Operating on a known quantity of tannin, and deducting the permanganate necessary for the oxidation of the indigo alone, the exact strength of the permanganate expressed in tannin is, of course, obtained.

In applying the process to wine, which, of course, contains many other organic matters, also oxidizable by permanganate, the author proceeds as follows: 20 cc. of the sample is mixed with 2 litres of rainwater, 20 cc. of solution of indigo-carmin (30 grams per litre), and 10 cc. of sulphuric acid. A solution of potassium permanganate (1 : 1000) which has been carefully standardized is now run in until the liquid just loses its green, and changes to a bright yellow color. To obtain the amount of permanganate absorbed by the organic matter, 50 cc. of the sample is mixed with 100 cc. of a solution of gelatin (1 : 1000), and 60 cc. (= 20 cc. of original sample) is filtered off, and again titrated. The difference between the two titrations represents the true amount of tannin. The permanganate absorbed

by the excess of the gelatin varies but slightly, but may be put down as 0.2 cc. As regards the process depending on the precipitation of the tannin by an ammoniacal solution of zinc acetate, previous to titration, the author found it to give results far too high and generally untrustworthy, even with solutions of pure tannic acid.

ON BORIC ACID AND A NEW BORIC PREPARATION.¹

BY DR. JAENICKE.

Experiments were made to determine (1) the power of boric acid to kill bacteria, and (2) its capacity for preventing their development in animal fluids. The author tried the influence of a saturated (four per cent.) solution of boric acid on pure cultures of the *Staphylococcus aureus*, and also on anthrax bacilli. These organisms were placed in the boric acid solution, and then at regular intervals cultivations in sterilized broth were tried, and in some cases animals were injected. The staphylococcus could be cultivated after eight days' immersion in the boric solution, and in one case indeed after fourteen, and only after three weeks were they absolutely killed. The susceptible bacilli of splenic fever were, after twenty-four hours, still living, and capable of infecting a mouse. They died only after three days. These experiments prove that the disinfecting property of boric acid is so slight that for practical purposes it is of no value, and that boric acid is useless for the disinfection of hands, instruments, etc., or for applying to fresh operation wounds.

On the other hand, the power of boric acid to prevent the development and increase of micro-organisms, and the consequent production of toxines and toxalbumins, etc., is very considerable. The author added sterilized boric acid, in gradually increasing proportions, to blood-serum and broth, in a series of culture glasses, and then inoculated them with pure bacterial cultures, keeping them at 37°, and comparing the effects of this proceeding with what occurred in a control glass free from boric acid. The development of bacteria first took place in this glass, then it occurred in that containing the smallest amount of boric acid, and more slowly in those containing a larger amount, until at last no change took place. This occurred in blood-serum and broth containing *Staphylococcus aureus*, when 4 to 5 per cent. of boric acid was present; in the case

¹ *Therap. Monatsh.*; Abstract from Med. Chronicle, November, 1891.

of *Streptococcus pyogenes* when 6 per cent. was present; for stopping anthrax bacilli 9 per cent. was required; typhus bacilli did not develop under the influence of 7 per cent. Cholera spirilli were the most sensitive, for 3 per cent. arrested their development. Mould fungi ceased to grow in the presence of 4 per cent. But much smaller quantities of boric acid delayed the development for many days, and in some cases—especially the bacilli of anthrax—indications of degeneration were observed in the bacilli themselves. In order to ascertain how much boric acid one must add to the cultivation medium, in order to prevent development of all bacteria, the author mixed several materials known to favor the growth of micro-organisms—earth, sewer water, putrified blood, etc., and inoculated with this mixture a series of cultivation glasses containing serum and broth and also boric acid in gradually increased proportions, keeping the glasses in an ordinary incubator. The glasses with the least proportion of boric acid (1 per cent.) quickly became clouded, owing to the development of numerous micro-organisms of various kinds; more slowly the next glass, which contained 2 per cent. of boric acid, began to show some appearances, but not for three weeks, and then the clouding was only slight; the other glasses which contained $2\frac{1}{4}$ to 3 per cent. of boric acid remained without any bacterial growth, only a few fungi were developed in them. It may be assumed that in blood-serum and broth the growth of all bacteria is prevented by the addition of $2\frac{1}{2}$ per cent. of boric acid.

In using boric acid therapeutically, whether in substance or in solution, it should be present in excess so as to render the wound unfit for the settlement and growth of micro-organisms. The modes of application must vary with the varied conditions, which are described by the author.

Boric acid is devoid of irritating properties; it does not interfere with the properties of the tissues; it is comparatively devoid of poisonous properties, 70 grams per day having been given internally. It takes $\frac{1}{1500}$ to $\frac{1}{1200}$ of body weight to kill mice. It is four or five times less poisonous than carbolic acid and resorcin and salicylic acid. Borax is not affected by the soft tissues with which it comes in contact.

After its use the author never saw inflammation or formation of pus take place; suppuration quickly disappears, the tendency to the formation of granulations in wounds is rather kept back than encour-

aged. Since boric acid, at ordinary temperature, is only soluble in water, to the extent of 4 per cent, a boric substance was sought for possessing greater solubility and yet retaining its other properties. This combination of properties was found in a mixture of equal parts of boric acid and borax. The body so formed does not differ from boric acid in its antiseptic and pharmacological properties; it is neutral in reaction and forms hard crystals, soluble in water, in ordinary temperatures, to the amount of 16 per cent. At the ordinary temperature of the body a 30 per cent. solution can be made. At boiling temperature 70 per cent. is dissolved, and this does not separate quickly on cooling. The combination of boric acid and borax has been employed with great advantage in purulent affections of the middle ear. It is prepared by heating equal parts of borax, boric acid and water to boiling point; on cooling, crystalline masses separate. As the substance is only slowly dissolved at ordinary temperatures, the author advises that a solution, in the first place, be made with water at a boiling temperature.

[NOTE.—The proportions given by Dr. Jaenicke correspond to rather more than six molecules of boric acid, $B(OH)_3$, for one of borax, and the resulting product consists chiefly of Atterberg's (1875) salt, $B_4O_5(OH)_2 \cdot 3B_2O_3 + 10H_2O$. In prescriptions it has been designated *boroboric acid*.—Editor Amer. Jour. Phar.]

THE ESTIMATION OF IODOFORM.

BY H. DROOP RICHMOND.

When iodoform is heated with alcoholic soda it is split up with the formation of sodium iodide, sodium formate and other substances; the proportions appear to be that $16CHI_3$ require $42NaOH$, and give $35 NaI$ and $4KHCO_2$; the estimations made were as follows: for 100 parts iodoform:

	Found.	Calculated from above proportions.
Soda,	26.4	26.6
Iodine as iodide,	69.3 to 70.4	70.2
Formic acid,	3.34	2.92

These figures show that the reaction is a complex one, and I have not attempted to construct an equation to express the changes which take place; with the assumption that for every 100 parts of iodoform, 70 parts of iodine are produced as iodide, a fairly reliable method of working is possible; about .1 — .15 gram of iodoform

or such quantity of the substance to be examined as will give that quantity, is weighed out and dissolved in alcohol, an excess of alcoholic soda is added, and after about ten minutes' digestion near the boiling point of the alcohol, the excess of alcohol is evaporated; the residue is taken up with water, made slightly acid with *dilute* nitric acid and a small quantity of calcium carbonate added to restore neutrality. The solution is then titrated with the solution of nitrate of silver used for water analysis (of which 1 cc. = .005418 gram iodoform); an excess of about .3 cc. is required to produce a good end reaction with chromate of potash, and this should be subtracted.

SOLUBILITY OF IODINE IN CHLOROFORM.

BY W. DUNCAN.

Some time ago I had occasion to prepare a solution of iodine in chloroform. The difficulty I had in getting the required amount into solution brought to my recollection a remark of one of my students, to the effect that he had found it impossible to make a solution stronger than about 1 grain of iodine in each drachm of chloroform.

On referring to standard works I found that, with one exception, those which refer to the point state that iodine is freely soluble in chloroform. The exception is Squire's "Companion," in which the solubility is given as 1 in 25. I have utterly failed to obtain a solution of this strength, and, for my own satisfaction, have lately made some experiments to clear up the point.

Commercial iodine was taken, mixed with a fourth of its weight of potassium iodide, and carefully sublimed. The sublimate was cooled, powdered and placed in a desiccator to remove any trace of moisture. This chemically pure iodine was then macerated in chloroform for four days, the temperature remaining nearly constant at 10° C., and the mixture being frequently shaken.

Iodine being very volatile, the only methods of estimation possible were either gravimetric, as argentic iodide, or volumetric. The latter method was chosen on account of the comparative ease and rapidity of the process, and if care be taken to have the thiosulphate of sodium solution correct, it is quite as accurate as a gravimetric estimation. The result of a large number of estimations carefully made is to show that at 10° C., chloroform dissolves only

1.77 per cent. of its weight of iodine, or, to put it differently, the solubility of iodine in chloroform is 1 in 56.6. I may say that my results with a solution in which the two have been in contact for two months, are practically the same as the foregoing.

While working at the subject I found it was absolutely necessary, to get good results, that after weighing, the chloroform solution should be diluted with a little alcohol before adding the water, as otherwise the iodine would be thrown out. I found it also necessary to use starch as an indicator, as the solution became apparently colorless before all the free iodine had been taken up.—Phar. Jour. and Trans., January 2, 1892, p. 544.

NOTE ON VOLUMETRIC SOLUTION OF IODINE.

By J. H. HOSEASON.

Read before the Edinburgh Assistant Association; reprinted from *Phar. Jour. and Trans.*, January 16, 1892, p. 583.

Though the point dealt with in this paper might seem a small one, it was desirable that the Pharmacopœia should be as completely accurate in every detail as it could reasonably be. He had prepared a standard solution of iodine with which he had examined a sample of arsenious oxide, and found it to be pure. Some time after, the same iodine solution was used with the same sample of arsenious oxide, and it indicated only 97 per cent. As_2O_3 . It was concluded that the iodine solution had deteriorated, but the question came to be how could its strength be ascertained without using arsenious oxide as a factor. Titration with standard soda solution was tried, but the end reaction, even with starch paste, was not sufficiently distinct. Nitrate of silver solution was also found to be inapplicable, as a portion of the iodide in the iodine solution combined with the silver at the same time. Certain points noticed seemed to indicate that iodine and iodide of potassium combined in a fixed ratio, but time did not permit of following out this inquiry.

A third method, which proved more satisfactory, was to add a known measure of standard potassium bichromate solution to a solution of potassium iodide in water with a sufficiency of dilute sulphuric acid. Iodine is then set free in the proportion of three molecules to one of potassium bichromate. Subsequent titration of this iodine with sodium hyposulphite solution determines the

strength of the latter, and from this hyposulphite of sodium solution a weak or unknown solution of iodine might be at once corrected or standardized.

Arsenious oxide might also be used, and it has the advantage of being permanent and nonhygroscopic.

The defect in the Pharmacopœia to which Mr. Hoseason directed attention was this: The standard iodine used to fix the value of the hyposulphite of sodium solution, is the one which answers the "characters and tests" of the Pharmacopœia. This official "iodine" is tested by using solution of sodium hyposulphite. It is evident, therefore, that the true value of the iodine can never be ascertained in this way, which is simply a case of reasoning in a circle. He suggested that the following should be the directions for preparing the volumetric solution of iodine: "Mix intimately in a mortar, in the proportion of one of potassium iodide to four of iodine; place in a suitable arrangement and sublime. When cool place the sublimate in a desiccator for two hours. Of this chemically pure iodine, weigh off quickly on a paraffined paper the quantity required, or an unknown quantity may be weighed from weighing tubes and made up to the proper volume with water, so that each 100 cc. contain 1.27 grain of pure iodine." He had examined some commercial and resublimed samples of iodine with the following result:

No	Quality.	Description.	Iodine per cent.	Moisture per cent.
1	Resublimed.	Fine lustrous scales thin, dry.	100	0.0
2	Resublimed.	Small crystalline fragments and dry dust.	99.5	0.5
3	Commercial.	Fine scales and dust.	99.4	0.6
4	Resublimed.	Very small crystals; lustrous, dry.	100	0.0
5	Resublimed.	Very large thick scales and crystalline masses, very moist.	96.6	3.4
6	Resublimed.	Very large thick crystalline scales, moist.	99.2	0.8
7	Commercial.	Dry powdery mass.	97.6	2.4

{ slight
fixed
residue.

}

None of the samples contained chlorine or bromine in quantity. Sample 2 contained a trace of chlorine, and the two commercial samples contained a trace of non-volatile matter, but were otherwise of unexpectedly good quality.

ON THE ACTION OF ANTIFEBRIN, AND PHENACETIN DERIVATIVES.¹

BY H. ARONSEN.

This paper, whilst it adds but little to our practical therapeutical knowledge, is one of those contributions to pharmacology by the accumulation of which a firm basis for therapeutics will in time be founded. It is of interest, too, as illustrating the methods by which the physiological influence of those groups of atoms, of which organic compounds consist, is being determined.

It has been shown by Ehrlich that certain kinds of coloring materials taken into the body will distinctly color the brain tissue; but that the introduction into the coloring compounds of a sulpho-group prevents this. Thus, for example, *sodium alizarin* colors the brain yellow, whilst the introduction of a sulphonic acid group into this compound entirely prevents this action.

Aronsen brings forward experiments to show that in like manner the influence which certain antipyretics have in lowering temperature in fever through their influence on the nervous centres, is entirely stopped if an acid group be introduced into their composition.

Liebreich has shown that *acetyl-amido-salicylic acid*, which contains two antithermic groups, antifebrin and salicylic acid, is not itself an antipyretic, and the ethyl compound of this body is likewise not a temperature reducer. In both these bodies the carboxyl group COOH is associated with the benzol component. But it is possible to introduce this group into the second or amido component. Only one body (*acetanilid-acetic acid*) in which such introduction has occurred has yet been examined, and it has been found by Penzolt not to be useful as an antipyretic.

Aronsen points out that this influence may perhaps be due to the breaking up of the group C^6H^5NHCO , to which the compound seems to owe its antipyretic activity, for the introduction of a CH_3

¹ *Deut. med. Woch.*, Nov. 19, 1891; the *Med. Chronicle*, Jan., 1892.

into the amido component has the same effect in depressing the antipyretic influence. He has, therefore, experimented on a substance—*para-ethoxytartranilic acid*—in which the carboxyl group is neither combined with the benzol nor with the amido component. This substance is a white, tasteless powder, not as toxic as phenacetin, though in sufficient doses it causes changes in the blood. Unlike phenacetin, however, it does not depress temperature in fever. *Succinanilic acid*, which is of analogous composition, gave the same result.

These experiments all go to show that in whatever way the carboxyl group COOH is introduced into an antifebrine or phenacetin molecule it destroys its antipyretic quality.

Aronsen finds, too, indications that the presence of other acid elements, apart from the salt-forming acid group, suffice to prevent the antipyretic activity in the same manner as the carboxyl group does.

Acetylpara-amidoacetophenon has the same composition as phenacetin, except that the group OC^2H^5 is replaced by the acetyl group CO CH^3 , but the antipyretic action of phenacetin is quite wanting in the first-named compound. If it were possible to introduce an acid element into acetanilid or phenacetin, without destroying their antipyretic properties, a soluble antipyretic could be obtained. But Aronsen's observations go to show that this is impossible, and a soluble antipyretic can only be obtained from acetanilid or phenacetin by putting into these compounds a basic group. Such a substance is *phenocoll*, the antipyretic and antirheumatic properties of which have been recently proved by Hertel.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, January 19, 1892.

The meeting was called to order, and Wm. B. Webb, Ph.M., was requested to preside.

The minutes of the last meeting were read and approved.

The following donations to the library were made : By Mr. Hans M. Wilder, eleven volumes of Wiggers' *Jahresbericht*, vols. xxvi to xxxvi, inclusive, Flückiger's *Pharmacognosie des Pflanzenreiches*, and Dr. G. Heppe's *Chemische Reactionen* ; by the author, Prof. Trimble, vol. i, of his monograph, entitled *The Tannins* ; also received from the associations, *Proceedings of the American Pharmaceutical Association for 1891*, and *Year-book of Pharmacy of the British Pharmaceutical Conference for 1891*. A vote of thanks was moved and carried to the donors.

A paper upon *Trillium erectum* was read by Mr. Vivian I. Reid of the present senior class.

Professor Trimble read a paper on the seeds of *Purshia tridentata*, the material having been sent by Dr. Havard, U. S. Army.

A paper on the *business aspects of pharmacy*, by Joseph Harrop, was read by Joseph W. England.

Mr. William B. Thompson read a paper suggested by an article in one of the medical journals, under the title of Remarks on Pharmacists.

A paper upon *percentages in solutions* was read by Joseph W. England, Ph.G.

Prof. Maisch said that the only exact method of making solutions of a definite percentage was by basing the calculation upon the proportion of weight of the article to be dissolved to the total weight of solution obtained ; if a definite volume of such a solution be wanted, it should be measured afterwards. In the discussion, attention was drawn to percentages by volume, and it was stated that in many cases, on mixing liquids, condensation of volume was observed, and that wherever chemical action takes place change of volume was sure to follow.

Mr. England made some remarks on *pyoktanin* of the several kinds in the market, and said that the conclusions of those who had used it were not as favorable as the reports first made about it.

F. W. Haussmann, Ph.G., read a paper upon *fluid extract of vanilla* ; he said that inquiry of three or four druggists revealed the fact that they used two and a half ounces of the bean to make a gallon, as it was not possible to compete with the grocery store vanilla extracts in price if the full quantity of bean were used. Some of the members present stated that they had always made flavoring extract of vanilla of the strength of one ounce to the pint. Attention was also drawn to the pharmacopœial tincture, which is of 10 per cent. strength. Prof. Maisch said that about 25 years ago he saw a short and rather thick vanilla, much lower in price than Mexican or Bourbon vanilla ; but that the drug brokers would not sell him even a sample for his cabinet, as they were under contract to furnish all to certain manufacturers of flavoring extracts. Mr. Thompson said that apothecaries had or could have sufficient influence to get laws passed preventing the sale of articles inferior in quality or made in imitation of good preparations sold by the apothecary. The term adulteration is one that is difficult to define ; the mixing of one substance with another of less value or strength is generally considered an adulteration, but certain commodities have to be colored to some extent to satisfy popular demand.

This discussion led to some remarks on *Alexandria senna* as illustrating changes in the character of articles of commerce. Prof. Maisch said that thirty and more years ago the Alexandria senna of commerce consisted of the leaflets of *Cassia acutifolia* mixed with the leaves of *Cynanchum Arghel* in varying proportions ; the latter were, in later years, sometimes entirely absent. The political complications in the Soudan caused a scarcity of supply of *C. acutifolia*, and for some time these leaflets were mixed to some extent with those of *C. obovata*, and the latter were even offered as senna. These had been used, in 1876, as packing material for Egyptian goods sent to the Centennial Exhibition ; they were regarded in Egypt as of little medicinal value. Recently he had been able to procure from wholesale druggists as Alexandria senna an article consisting of small leaflets of *C. elongata* mixed with a very small pro-

portion of *C. acutifolia* and *C. obovata*; arghel leaves were absent, also *C. pubescens* had not been observed. A very handsome and clean specimen of *C. acutifolia*, almost free from impurities, had been procured from Dr. C. A. Heinitsch.

In reply to a query as to whether *C. marilandica* could not be used, Prof. Maisch stated that this was generally considered as being only about one-half as active; that the true sennas came from shrubs of the subgenus *Senna*, and that our indigenous plant belonged to another group, *Chamæsenna*, the botanical distinctions of which were pointed out.

Mr. Thompson referred to the case of a milk dealer, who a short time ago was convicted of adulteration for selling skimmed milk as milk, the court having decided that the removal of an essential constituent from an article of food constituted adulteration. This led to the recital of some cases, showing the importance of a supply of unadulterated milk in large cities. It was stated that the law of Pennsylvania, like that of Massachusetts, required cow's milk to contain not less than $12\frac{1}{2}$ per cent. of solids.

On motion, the papers read were referred to the Publication Committee, and the meeting adjourned.

T. S. WIEGAND, *Registrar*.

EDITORIAL.

The seventh International Pharmaceutical Congress.—On page 470 of our preceding volume we published the translation of a circular-letter from the Italian Committee on Organization in which it is stated that the Italian pharmacists are not prepared for the present to convene the seventh congress. On p. 755 of the Proceedings of the American Pharmaceutical Association we find a letter printed, showing that the Executive Committee of the sixth Pharmaceutical Congress has expressed itself favorably regarding the acceptance of the invitation extended by the American Pharmaceutical Association for holding the next Congress in Chicago in 1893; and that the Italian Committee has been advised to cede to the American Pharmaceutical Association the powers received from the Congress of 1885.

The Columbian World's Congress of Pharmacists is the title of one of those gatherings of specialists which it has been proposed to convene in Chicago during the year 1893, under the auspices of "The World's Congress Auxiliary of the World's Columbian Exposition." A committee appointed by the "Auxiliary," consisting of Prof. Oldberg, chairman, and Messrs. E. H. Sargent, Alb. E. Ebert, D. R. Dyche and L. C. Hogan, has just issued a preliminary address, inviting all practitioners of pharmacy, pharmaceutical teachers, authors and journalists, members of pharmaceutical societies and examining boards, and of pharmacopœial committees, manufacturing pharmacists and chemists, and others connected with pharmacy. A special request to send representatives is made to pharmaceutical societies, schools and examining boards, pharmacopœial committees, and other organized pharmaceutical bodies. The objects of this Congress are stated to be the delivery of addresses upon topics of general pharmaceutical interest, the reading of papers upon pharmaceutical questions of a general scope, discussion upon such questions, and mutual acquaintance and intercourse. The meetings are to be so arranged as to take

place between the several medical and allied scientific congresses, so that pharmacists who may be specialists in chemistry, botany, microscopy, etc., may participate in two or more of the congresses held. The Memorial Art Palace, which is to be erected on the shore of Lake Michigan, will contain two large audience rooms and a number of smaller halls for the accommodation of the congresses and of other meetings. The month of May or June, 1893, is suggested for holding the Congress.

The American Pharmaceutical Association, intending to co-operate in the work, appointed a Committee, consisting of the five members appointed by the "Auxiliary," and of Prof. Hallberg and the President and Permanent Secretary *ex-officio*. In addition thereto an Advisory Council is to be formed of both foreign and American Pharmacists, and all interested and intending to participate in the contemplated congress are invited by the Committee to communicate to its chairman any suggestion relating to the plan mapped out by the committee.

The Pennsylvania Pharmacy Board held the October examination in the Central High School at Philadelphia, and in the City Council Chamber at Pittsburg. The January examination was held in Philadelphia, Monday the 18th.

Applicants for Registered Pharmacist's Certificate, 105, passed 39 in October; 106, passed 28 in January.

Applicants for Qualified Assistant's Certificate, 109, passed 72 in October; 115, passed 57 in January.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Proceedings of the American Pharmaceutical Association, at the thirty-ninth annual meeting, held at New Orleans, La., April, 1891; also the Constitution, By-laws and Roll of Members. Philadelphia: Published by the American Pharmaceutical Association. 8vo. Pp. xxiv, 767 and 138 (General Index).

The "Minutes" of the above meeting were sent out to the members in August last, and early in January the bound volume of the "Proceedings" was distributed to those entitled, containing, besides the Minutes, the valuable report on the progress of pharmacy, and the usual matter issued annually with the "Proceedings;" also a general index for the volumes 31 to 38 (1883 to 1890), inclusive. It is learned from an abstract of the Minutes of the Council, that the date for the next annual meeting has been fixed for July, the first session to be held on the morning of Thursday, July 14, and the last session probably on Tuesday evening, July 19. Among the interesting information contained in the volume is the correspondence in relation to the contemplated seventh International Pharmaceutical Congress, which was to assemble in Milan, Italy, and the proposed International Pharmaceutical Congress, in Chicago, in 1893. The General Index was prepared for eight volumes with the view of having hereafter a decennial index published at the close of each decade, as it was intended to do since 1859.

Year-book of Pharmacy, comprising abstracts of papers relating to Pharmacy, Materia Medica and Chemistry, contributed to British and foreign journals from July 1, 1890, to June 30, 1891; with the Transactions of the British Pharma-

ceutical Conference at the twenty-eighth annual meeting held at Cardiff, August, 1891. London: J. & A. Churchill. 8vo. Pp. 544.

The Year-book gives upon 295 pages abstracts from the various journals, and concludes with 18 additional pages containing pretty complete lists of books relating to pharmacy and the collateral sciences. The remaining portion of the volume contains the list of members and the minutes of the last meeting, together with the papers read and the discussions relating thereto. The indispensable index closes the volume.

The Tannins. A monograph on the history, preparation, properties, methods of estimation and uses of the vegetable astringents, with an index to the literature of the subject. By Henry Trimble, Ph.M., Professor of Analytical Chemistry in the Philadelphia College of Pharmacy. Vol. 1. Philadelphia: J. B. Lippincott Company. 1892. Pp. 168. Price, \$2.

This very interesting monograph makes its appearance at a very appropriate time, namely, at the close of the first century of the recognition of tannin as a distinct principle, which is generally ascribed to the French apothecary Deyeux, in 1793. Without entering into the old views concerning the nature of astringent vegetable substances, the author opens the history of this class of substances, with an account of the results arrived at by Deyeux, and of those of various observers immediately preceding him; and closes the same with Proust's announcement in 1802 that there are many different kinds of tannin in different plants. This historical introduction is followed by chapters on the general characters and on the detection and estimation of tannins; and in Part II by a monograph on gallotannic acid, giving its sources, history, preparation, properties and constitution. A very useful and interesting selection from the very extensive literature on the tannins, commencing with 1791, is given in the lists of authors, of titles and of books, with which the present volume closes. It is to be hoped that the second volume of the work may make its appearance at no distant day.

Age of the Domestic Animals: being a complete treatise on the dentition of the horse, ox, sheep, hog and dog, and on the various other means of determining the age of these animals. By Rush Shippen Huidekoper, M.D., Veterinarian (Alfort, France), Professor of Sanitary Medicine and Veterinary Jurisprudence, American Veterinary College, New York. Illustrated with 200 engravings. Philadelphia and London: F. A. Davis, Publisher, 1891. 8vo. Pp. viii and 217. Price, cloth, \$1.75.

In the introductory chapter the author defines the three periods of age in animals, namely, the juvenile or period of growth; the adult or stationary period; and senility or old age, the period of deterioration or of decline. The changes which take place during these periods, depend not only upon inherent or internal causes, but are more or less influenced by external conditions. The age of a domestic animal becomes apparent from its general aspect, from the changes in the conformation of the body, and from the functional activity of its organs, all of which have to be examined in detail, but primarily the condition of the teeth gives the desired information, while changes in other organs must be considered to be of secondary importance for the purpose indicated. For these reasons great prominence is given in the book before us both in descriptions and illustrations to the teeth, their development and changes in

character with advancing age, however, without neglecting other characteristics. From a perusal of the book it is readily seen that the author has fully accomplished his aim, as stated in the preface, according to which he "has attempted to prepare such a book as he feels would have been of interest and service to himself in his association with animals as a layman, and would have aided his studies and appreciation of the anatomy of the teeth, dentition, and means of determining the age. He hopes, also, that this work will furnish, to students and veterinarians, knowledge which will aid in surgical operations on the mouth."

An Examination as to the Reliability of certain Tests for determining the purity of olive oil. By Professor S. Cannizzaro, vice-president of the Senate, Italy, and Dr. G. Fabris, analytical chemist of the Italian customs. 8vo. Pp. 41.

Messrs. Jas. A. Hayes & Co., Boston, have published, in English, this important and interesting report, which proves the great difficulty of establishing the purity of a sample of olive oil from color reactions or the behavior towards certain chemical agents. "An absolutely correct judgment," the authors say, "as to whether an olive oil be pure or not, can be arrived at only from the aggregate results of all the recognized tests and processes already mentioned, and even of any other which the circumstances of each individual case may call for."

Proceedings of the Minnesota State Pharmaceutical Association, at the seventh annual meeting, held at St. Paul, Sept. 9 and 10, 1891. St. Paul. Pp. 96.

Much of the discussion at this meeting related to the various plans for the prevention of cutting in prices. An important measure for the State of Minnesota is the appropriation by the Legislature of \$5,000, for the establishment of a school of pharmacy in connection with the State University; this department will be located in the new medical building, and will be opened for instruction in October next. The next meeting will be held in Duluth at a time to be announced hereafter. F. W. Kugler is local secretary.

Proceedings of the Iowa State Pharmaceutical Association, held at Spirit Lake, July 21 and 22, 1891. Twelfth annual meeting. Marshalltown. Pp. 101.

A brief account of the meeting will be found on p. 467 of our last volume. The next meeting will be held in Davenport, June 14. J. W. Ballard is the local secretary.

Proceedings of the New Hampshire Pharmaceutical Association at the eighteenth annual meeting. Manchester, N. H. 1891. Pp. 56.

The meeting was held at Exeter and at Rye Beach, September 8 and 9. President Currier in his annual address alluded to the forthcoming meeting of the American Pharmaceutical Association in the White Mountains, N. H., and expressed the wish for every member to be there in attendance, and that the A. P. A. would gain many new members from the State. The president and executive committee were empowered to make such arrangements as they may deem advisable, in behalf of the Association, towards the reception of the American Pharmaceutical Association. The executive officers for the ensuing year are E. H. Currier, Manchester, president; F. L. Way, Manchester, sec-

retary; and A. D. Smith, Manchester, treasurer; W. P. Underhill, Concord; F. L. Way and G. C. Shedd, Keene, constitute the executive committee. The next annual meeting will be held at Keene, September 6, next.

Minutes of the Twelfth Annual Meeting of the North Carolina Pharmaceutical Association. New Berne, N. C. 1891. Pp. 80.

A brief account of the meeting will be found in our September 1891 number, page 468. Among the papers read is one in which Mr. W. H. Wearn endeavors to prove the presence of tannin in gentian root: his compound is obviously the one which was noticed by Prof. Patch in 1881. The investigations by Van Itallie, made in 1886 with dry gentian and with the fresh roots of three species of gentiana, were evidently unknown to the author. Next meeting in Raleigh, August 10. W. H. King, local secretary.

Proceedings of the National Wholesale Druggists' Association, in convention at Louisville, Ky., Galt House, October 19-23, 1891. Geo. B. Bower, official stenographer. Minneapolis. Pp. 243.

The volume, which is adorned by the likeness of the president, Wm. A. Robinson, and is issued by the secretary, A. B. Merriam, Minneapolis, contains a full account of the discussions at the meetings, and of the speeches at the banquet. Much time was devoted to the consideration of plans for preventing the cutting of retail prices of proprietary articles.

Grasses of the Southwest. Plates and descriptions of the grasses of the desert region of Western Texas, New Mexico, Arizona and Southern California. Part II. By Dr. Geo. Vasey, Botanist, Department of Agriculture. Washington: Government Printing Office. 1891.

This valuable contribution to North American botany contains plates and descriptions of 50 species of grasses, making a total of 100 species, including those of Part I. Most of these plants are but little known, and a goodly number are new species. It is intended to publish a second volume containing the grasses of the Pacific Coast.

Catalogue of the phænogamous and vascular cryptogamous plants in the vicinity of St. Louis, Mo. By Henry Eggert, St. Louis, Mo. Pp. 16. Price, 20 cents.

This catalogue, which is arranged alphabetically, contains the names of nearly 1,100 species which grow in a radius of about 40 miles of St. Louis.

Experiments and Researches on Trap Syphonage, showing the comparative merits of the principal appliances used for trap-seal protection. By Jas. M. Denton, M.E., professor of experimental mechanics in Stevens Institute of Technology, Hoboken. Concord, N. H. 1891. Pp. 56.

Reprint from vol. xvi of the Transactions of the American Public Health Association.

Annual Report of the Postmaster-General of the United States for the fiscal year ending June 30, 1891. Washington. Pp. 183.

A public document containing much interesting statistical information, and embellished with maps and plates, the latter made after photographs of parts of different post-office buildings.

OBITUARY.

Thomas Hyde Hills, a prominent pharmacist of London, England, died in that city November 19, 1891, in the seventy-seventh year of his age. After having learned the apothecary business at Brighton, he secured a situation in the store of John Bell, in London, and after the death of the latter, continued the business as the partner of Jacob Bell who died in 1859. Mr. Hills was the first Associate, 1841 to 1847, of the Pharmaceutical Society of Great Britain, was elected a member in 1848, and subsequently served for many years as vice-president, treasurer and president. He was also a member of the British Pharmaceutical Conference, and held the office of vice-president for several years.

F. Passmore died in London, December 22 last, after a few days of illness. For nearly twenty-two years the deceased had occupied the position of sub-editor of the *Pharmaceutical Journal and Transactions*.

Professor Jean Servais Stas died in Brussels, Belgium, December 13 last. He was born at Louvain, September 20, 1813, and studied medicine, but soon turned his attention to physics and chemistry, working in the laboratory of J. B. Dumas in Paris. He was afterwards appointed professor of chemistry at the Military Academy of Brussels, and chemist to the mint, and in 1841 was elected a member of the Academy of Sciences in the same city. His researches into the atomic weight of carbon, published in connection with Dumas in 1841, were afterwards extended by him to most other elements, and led to greatly increased perfection in the methods for the determination of such values. The criminal case Bocarmé in 1850 attracted universal attention in scientific circles, when, after patient investigations Stas proved nicotine to have been employed for poisoning. Of the numerous memoirs published by the deceased savant, the following are of especial interest to pharmacists: On phloridzin (1838); chlorinated compounds (1841); acetal (1846); nicotine (1850); berberine (1859); fatty acids (1865), and particularly his celebrated method for the isolation and detection of alkaloids (1852), upon which most of the processes more recently recommended are based. The deceased was attached to many scientific bodies as an honorary or active member; he was an honorary member of the Philadelphia College of Pharmacy.

Emmet Kannal, Ph.G., class 1871, died at Rensselaer, Ind., July 31, 1891, aged 42 years. He learned the drug business in Rensselaer and after graduation, continued in the pharmaceutical business in the same town until 1887; from that time until his death he was in the jeweler's business, and was also much interested in farming and stock-raising. He died of hemorrhage of the bowels, after an illness of two days, leaving a widow and three children.

Leonidas H. Street, Ph.G., class 1875, died in Camden, N. J., Decbr. 10, 1891, of typhoid pneumonia. For some years after he graduated he was in charge of the drug store of Dr. E. Tomlinson, at Gloucester, N. J., and subsequently entered into business in Camden.

Harry B. Taylor, Ph.G., class 1869, died in Philadelphia, Decbr. 17, from exhaustion, the result of blood poisoning. He was the son of the late Dr. Wm. T. Taylor, in whose drug store he was brought up. After his father's death he continued the business for some years, and studied medicine, grad-

uating from the University of Pennsylvania in 1886. He then became one of Coroner Ashbridge's official physicians, and as such, in September, 1890, made post-mortem examinations of several bodies at the Morgue, when one of the assisting students who was sewing up a body, accidentally punctured Dr. Taylor's left wrist with the needle which he was using. Recognizing the gravity of the occasion, he at once had the slight wound cauterized. For a time it gave him no trouble, but afterward abscesses formed on both arms, and although the best medical aid was called in and he took several trips for the benefit of his health, he obtained no relief. Other abscesses formed in his throat and lungs, and he finally died from exhaustion. At the time of his death Dr. Taylor was 41 years of age; he was not married, but was the main support of seven younger sisters who lived with him.

VARIETIES.

Creasote in tuberculosis.—After nine years of experience with small doses of creasote (half a grain daily); Dr. Julius Sommerbrodt, in 1887, expressed himself as inclined to the belief that in the first stages of tuberculosis of the lung, creasote can cure. After using larger doses (1 to 2 grains daily) lasting cures were recorded in long continued and severe cases, and after continuing his observations he reports (*Berl. klin. Wochenschr.*, October 19, 1891) that creasote, in large doses (1 to 4 grains per day), is, for countless cases, unsurpassed as a curative agent in tuberculosis of the lung. For a patient over 10 years his minimal dose is one grain daily, and his maximum dose four grains daily. He has never found bad results from his largest doses. The excipient is of importance. He prefers to give it with cod-liver oil in gelatin capsules, containing one grain of creasote. It keeps best and is best absorbed and best taken in this form. His patients have no other medicine. It usually takes two or three months before its influence is very noticeable. Great numbers of his patients have taken five, ten, twenty thousand capsules *continuously* without a bad symptom, and with excellent appetites, and this in itself is an answer to the objection that it injures the stomach.

Piperazine, $C_4H_{10}N_2$, has the constitution of piperidine, $C_5H_{11}N$, in which CH_2 has been replaced by NH ; it has been experimentally used by a number of physicians in cases of gout and of gravel and urinary calculus, due to uric acid concretions. Dr. Heubach (*Centralb. f. Physiol.*, Decb., 1891) has given it subcutaneously in doses of 0.5 gm. four times daily, the injections being painful, but without causing abscesses or unpleasant after-effects. Taken internally in doses of 2.5 gm. it caused severe headache on the following morning, and in one case vomiting. Doses of 1 gm. were taken regularly for several days without causing any derangement. The quantity of urine is not increased; it remains acid, and shows no increase of N (urea) or of P_2O_5 ; but passed from the fourth to the tenth hour after taking the remedy, becomes dark colored on the addition of HCl , the coloring matter being separable by means of amylalcohol.

THE AMERICAN JOURNAL OF PHARMACY.

MARCH, 1892.

NORTHERN SENEGA.

BY L. E. SAYRE, University of Kansas.

The geographical distribution of senega has been a subject of a good deal of interest to the members of the pharmaceutical profession and the drug trade for a number of years. Chief among the contributors to our present knowledge of the drug in this particular have been Prof. J. M. Maisch and Prof. J. U. Lloyd, as will be seen by glancing over the back numbers of the American Journal of Pharmacy, the Proceedings of the American Pharmaceutical Association, and other pharmaceutical publications.

Reference has been made to senega growing in Wisconsin and Minnesota, but there has not been very definite information given, I believe, as to its collection or the exact district of country from which it is collected in these States. "Northern Senega" has been a current term meaning a variety of senega having certain physical characteristics very unlike the original *Polygala Senega*. Prof. Lloyd (Proc. Amer. Pharm. Asso., 1881), describing this variety—which he says is derived from the Northwest from the States of Wisconsin and Minnesota—says it is very large and fleshy, sometimes white, again rather dark brown, the knotty crown measuring often from two to three inches in diameter, even of the dried plant. The root just below the knotty head is (when dry) from the size of the little finger to that of the thumb of a man; six to ten inches in length and generally destitute of keel; not so contorted and branched as the "Southern" senega.

L. L. Dyche, Professor of Zoölogy and Taxidermy, of the University of Kansas, some months ago made an extensive hunting

tour in the Northwest, the main point of his operations being in that country lying near the Lake of the Woods. During this hunting expedition he had an excellent opportunity of studying the country, its products and its people. On his return he handed me a root which he thought might be of some interest to me. He said it was collected in very large quantities and seemed to be one of the staples of that country. The natives depending upon its collection as one of the means of subsistence, have made this quite an industry among them. There the squaws and the children dig the root while the "Braves" hunt the valuable fur-producing animals. Prof. Dyche says that he saw at the different trading posts in Marshall and Kittson Counties, in the storehouses, as much as a thousand pounds stacked up in one heap. At a little town, Rocksted, near Thief River Falls, the Indians come in from long tramps of forty miles or more and bring in the fur, skins and this snakeroot. Here they had an immense stock on hand. Since his return, Prof. Dyche has received a letter from a trader at Jadis, Kittson County, stating that he has on hand a thousand pounds bagged up, waiting for a fair market price.

The root referred to is undoubtedly a good sample of senega. In length it varies from 4 to 8 inches; in diameter from $\frac{1}{16}$ to $\frac{1}{2}$ inch. Surrounding the root is a dark scar-covered head, having a diameter of from $\frac{1}{4}$ to $\frac{1}{2}$ inch. This head in the case of younger roots is covered with immature pinkish leaf-covered stems. The characteristic keel of Southern senega is rarely present and the contour of the root is much less contorted. The color ranges from the light yellow of young roots to the dark brown of the older ones.

Near the head, prominent annulations are present. These continue with enlarging intervals of space for some distance down the root. Lengthwise the whole root is deeply wrinkled, while frequent warty enlargements occur. The branches are not numerous. In considerable quantities, the odor of gaultheria is quite prominent, as it is also in a cold aqueous infusion. The taste is very acrid.

Under the microscope the wood is found to be cylindrical, and the ingrowth of the inner bark on one side which produces the keel of the Southern variety is not apparent in a majority of cases. The wood is whitish, ligneous and occupies about $\frac{1}{3}$ of the diameter of the root.

A sample of the drug was handed to Mr. McClung, one of the

senior students, for the estimation of the polygalic acid. He used Quevenne's process, and obtained of the pure acid 3.5 per cent. Methyl salicylate was abundant, as shown by the ferric chloride test.

It would seem from the above that this specimen handed to me by Prof. Dyche represented a good sample of senega; its quality, equal to the average root of the market.

I have planted some of the roots, which seem to be full of vigor, and hope to be able at some future time to classify the plant.

FALSE ANGUSTURA BARK.

By W. J. SMYTHE.

The substitution of the bark from a species of *strychnos* as well as other barks for the bark of the true *angustura* (*Galipea cusparia*) has frequently occurred, and authorities have repeatedly called attention to it, but within the last few years apparently but little of it has been practised. This may be to some extent due to the fact that a number of our standard books of reference supply a description of the false barks as well as a number of chemical tests whereby the true bark may be distinguished from the others, thus making the sophistication comparatively easy to detect. None of the literature which I have been able to consult on this subject contained any reference to the percentage of alkaloid or alkaloids contained in the false (*strychnos*) bark. So that the results which I obtained from the assay of a specimen of the *strychnos* bark, which a short time ago was placed in my hands for assay under the supposition that it was a specimen of the true *angustura* bark, may prove of interest, especially as the percentage of the total alkaloids was so very high.

The specimen was in the form of a coarse powder of a brownish red appearance and devoid of the aromatic odor usually met with in the true *angustura*. The taste was intensely bitter and entirely different from that of the true bark. From the condition of the specimen botanical identification was of course out of the question. The very bitter taste at once suggested that the bark was of the false variety, and a few preliminary tests corroborated this. For the determination of the alkaloids, the following methods were employed:

(A) Five grams of the ground drug were macerated with 100 cc.

of a mixture of ether, chloroform, alcohol and concentrated ammonia (modified Prollius liquid) in a tightly closed bottle, and shaken vigorously at frequent intervals for 24 hrs. The mixture was then set aside until clear, when 50 cc. of the fluid representing 2.5 grams of the drug were drawn off by means of a pipette, transferred to an evaporating dish and the solvent completely expelled by gentle heat. The residue remaining in the dish was treated with a small quantity of 3 per cent. sulphuric acid, transferred to a small bottle and well washed with ether. A sufficient quantity of ammonia to make the solution distinctly alkaline was now added, and the liberated alkaloid taken up by successive portions of a mixture consisting of ether 3 parts and chloroform one part. The alkaloids were dried in the usual manner to a constant weight at a temperature of 105° C. The yield by this process was 6.4 per cent. total alkaloids.

(B) Five grams of the drug were placed in a Soxhlet extraction apparatus and exhausted with about 100 cc. of a mixture of chloroform, alcohol and ammonia. After complete exhaustion the solvent was expelled, and from this point the assay was carried on exactly as in the preceding process, the yield being 6.2 per cent. total alkaloids.

(C) Five grams of drug treated according to the method employed by Dragendorff for the estimation of the alkaloids in *nux vomica* (and which is so well known that I will omit giving the details here), gave me 5.76 per cent. of total alkaloids.

The results from these processes were very satisfactory, the mean indicating over 6.1 per cent. of total alkaloids.

An examination of the alkaloidal principle obtained from the above assays was next undertaken in order to prove the presence of brucine and if possible strychnine. Tests for brucine were applied as follows:

Nitric acid:—A few milligrams treated with concentrated nitric acid, at once gave the characteristic blood-red color.

Nitric acid and stannous chloride:—Another portion, treated with concentrated nitric acid, heated until the blood-red color had disappeared and the mixture had assumed an orange-yellow color; then cooled, diluting with a small volume of distilled water, and adding a drop of a freshly prepared solution of stannous chloride, at once produced the violet coloration which disappeared again on the addition of an excess of the reagent.

A number of other tests were also made, the results of which proved beyond doubt the presence of brucine.

The presence of strychnine as one of the constituents of the false bark, has been overlooked by some of the authorities on this subject, but W. A. Shenstone (in a paper read before the British Pharmaceutical Society, Dec. 5, 1877),¹ reports that he had succeeded in finding a small quantity of strychnine together with brucine in a specimen which he examined. Therefore, the alkaloids, obtained from the assays of the bark were very carefully examined for strychnine. In this case, the presence of such a large proportion of brucine rendered the reaction between sulphuric acid and potassium bichromate inapplicable, therefore I first employed the method recommended by Messrs. Dunstan and Short for the quantitative separation of strychnine and brucine,² which consists of precipitating the strychnine from an acid solution of the mixed alkaloids by means of potassium ferrocyanide (the brucine ferrocyanide remaining in solution), the subsequent decomposition of the strychnine salt by means of ammonium hydrate, and finally washing out the liberated alkaloid with chloroform. Two experiments were tried by this method as follows:

(1) 0.160 gram alkaloidal matter, treated according to the above process, after standing a few hours, deposited a very small quantity of a light brown resinous-looking precipitate which was decomposed by ammonia and exhausted with chloroform; on the evaporation of the chloroform, the residue failed to respond to the tests with potassium bichromate and sulphuric acid, but with nitric acid gave evidence of consisting largely or entirely of brucine.

(2) 0.243 gram treated in a like manner, with the exception that it was given a longer time in which to precipitate, gave the same result.

Failing to obtain any evidence of strychnine by the above method, a fresh portion of the specimen was exhausted in a manner similar to that employed by Mr. Shenstone in his examination, and the alkaloids obtained treated according to the manner adopted by him in his examination of brucine for the presence of strychnine, which I will quote as briefly as possible:

¹ Pharmaceutical Journal and Transactions, Dec. 8, 1877, p. 445.

² Year Book of Pharmacy, 1883, p. 469.

About 0.120 grams of the alkaloids treated with 3 cc. of dilute nitric acid in a small test tube and heated gradually by immersion in hot water. After effervescence had ceased and the yellow crystals of cacotheline had made their appearance, an excess of solution of potassium hydrate was added and the mixture cooled. The alkaline solution was then exhausted by means of chloroform. The chloroformic solution was evaporated to dryness, and the light yellowish residue treated with sulphuric acid and potassium bichromate at once gave the reaction for strychnine, clear and distinct.

Another experiment with a small quantity of the alkaloids also gave conclusive results. Owing to the limited quantity of material at my disposal, I was unable to make a quantitative determination of the strychnine, but the results of the application of the above method were sufficient to prove that the percentage is exceedingly small, and would probably have very little influence on the medicinal properties of the drug.

Steps have been taken to procure a fresh supply of the drug, if possible, which I hope to receive in the near future, when I intend to make a complete analysis of it.

DETROIT, MICH., February 12, 1892.

ON THE CRYSTALLINE FORM OF HYOSCYAMINE GOLD CHLORIDE.

BY J. B. NAGELVOORT.

Two years ago (see *Amer. Jour. Phar.*, 1890, p. 118) the writer recorded his observation on commercial atropine sulphate which was found to be hyoscyamine sulphate, and attention was drawn to the shape of the crystals of its gold chloride, being very different from that of atropine gold chloride, as figured by Prof. Wormley in his *Microchemistry of Poisons*, where, however, the hyoscyamine double salt is not figured.

The crystalline forms of the two salts seem to me to be less liable to be confounded, and more easily observed than some of the chemical requirements, like the pleasant odor developed on heating atropine under the conditions described by the *Pharmacopœia*. This test recommended by Professor Flückiger was stated by the late Prof. van der Burg (one of the authors of the Dutch *Pharmacopœia*) to be "not always a success."

For these considerations it seemed to be desirable to preserve drawings of the crystals of hyoscyamine gold chloride (magnified 100 diameters), as obtained by following the directions of the pharmacopœia. These forms are, certainly, just as characteristic as the melting point, which the Pharmacopœia, perhaps wisely, has omitted. Determinations of the melting point are delicate operations, and I know of instances that physicians have mistaken the term "melting"



for "dissolving." Very slight contaminations (they could scarcely be called impurities) with atropine lower the melting point of hyoscyamine gold chloride quite perceptibly. The writer has observed 155°, 152°, 153° C. While such variations for the reasons stated are, most likely, of no consequence to the ophthalmologist, they would not tend to insure in the pharmacist a feeling of absolute reliability in these mydriatic preparations.

Aristol was applied locally in certain cases of cancer, by Dr. E. Arcoleo (*Rif. Med.*, Oct. 1891); it relieves pain, arrests bleeding, lessens the discharge, corrects the offensive odor, and not being absorbed, has no toxic action.

Snuff for hay fever—Boric acid 2.0 gm.; sodium salicylate 2.5 gm.; cocaine hydrochloride 0.12 gm.—*Quar. Ther. Rev.*, Jan., 1892.

NOTE ON CODEINE SULPHATE.

BY JOSEPH W. ENGLAND, PH.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Feb. 16.

Codeine sulphate is now meeting with strong medical favor as an extremely prompt sedative in affections of the respiratory tract. It possesses an advantage over morphine salts in that it does not seem to check the secretions, and is devoid of disagreeable after-effects. The tendency to form a habit is said to be absent. It is also employed to alleviate pain, and can be continued for a long time. The writer has in mind a case of cancer, in which it was used for over two years with remarkably good results. The dose usually given ranges from $\frac{1}{8}$ – $\frac{1}{4}$ to $\frac{1}{2}$ grain, and sometimes a grain. It is either given in pill form or in solution; often in syrup of wild cherry. In our experience, the alkaloid codeine, which is officinal, is never used; the sulphate is always called for.

For convenience sake in dispensing, we have used for a number of months a standard solution of codeine sulphate, made with sixteen grains of the compound to each fluidounce of water. In using a certain firm's make, we have several times noticed an insoluble residue, which residue was completely soluble upon the addition of dilute sulphuric acid. Codeine sulphate obtained from other firms gave clear solutions with water; hence it became of interest to know what the insoluble residue was and its percentage.

The residue was a yellowish-white powder, sparingly soluble in water, which solution was alkaline in reaction and evinced no change with ferric chloride. It was soluble in alcohol, ether, benzol and chloroform. Added to nitric acid (s. g. 1.200) it dissolved to a yellow liquid, which did not become red. The solution added to mercuric chloride gave no precipitate. Dissolved in sulphuric acid the residue gave, with a trace of ferric chloride and gentle warming, a deep blue color. The reactions showed that the residue was the alkaloid codeine, probably present in the codeine sulphate through excessive heat employed in concentration of the solution for crystallization. The amount was 7.7 per cent. The possible dangers resulting from using a salt supposed to be entirely soluble in water, and containing such a heavy percentage of free and practically insoluble alkaloid, are obvious. Other samples of this same make, in the past, have contained as high a percentage.

ANALYSES OF SOME INDIGENOUS DRUGS.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy,
No. 105.

Phlox subulata.—Lee Steiñan has examined the overground portion of this plant and found the air-dried drug to contain 4.57 per cent. of moisture and 16.76 per cent. of ash.

Petroleum ether extracted 0.01 per cent. of volatile oil, 0.26 per cent. of fat melting at 41° C., 0.10 per cent. of a crystalline principle soluble in hot absolute alcohol and in chloroform. This is probably identical with the hydrocarbon found in *Phlox Carolina*.¹

Stronger ether extracted 0.92 per cent. of resin and chlorophyll from the drug.

Absolute alcohol extracted 2.20 per cent. of the drug and this extract was tested for alkaloids and glucosides with negative results. It appeared to be made up of resin with some decomposed chlorophyll.

With the aqueous solvents the usual plant constituents were found and there remained 30.77 per cent. of cellulose.

Myrica asplenifolia.—The overground portion of this plant has for a long time been used in domestic practice for "night sweats" and diarrhœa. Recently it has come into use to a certain extent by regular physicians and is prescribed in the form of fluid extract or syrup in cases of chronic diarrhœa.

Joseph H. Venn examined the drug which was collected near Philadelphia in October. The aromatic properties were found to reside in the resin, which, however did not lose anything corresponding to volatile oil at 110° C. nor was it found to contain any volatile aromatic acid.

The astringent property of the drug was found to be due to the tannin which was found to be present to the extent of 4.35 per cent. An additional quantity of the plant collected in January yielded 3.68 per cent. of tannin. This tannin was found to give a green color with salts of iron, and to yield some gallic acid by decomposition.

Gillenla trifoliata.—Frank W. White submitted this drug to a proximate analysis. His results point to the active principle being a glucoside which was obtained by agitating an aqueous solution of

¹ Am. Jour. Pharm., 1888, p. 321.

the alcoholic extract with chloroform. The following is a summary of the more important constituents estimated by him :

	<i>Per Cent.</i>
Tannin,	3'96
Fat,	0'60
Wax,	0'16
Resin,	1'88
Mucilage,	2'00
Lignin,	10'23
Incrusting matter,	17'43
Cellulose,	27'92
Moisture,	9'02
Ash,	13'28

COMMERCIAL RESIN OF SCAMMONY.

BY WALTER H. UMSTEAD.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy,
No. 104.

Read at the Pharmaceutical Meeting, February 16.

Inquiry among the wholesale drug dealers of Philadelphia, developed the fact that most of the scammony of this market comes from one importer. However, three specimens were secured, No. 1 from Dr. Squibb, and Nos. 2 and 3 from dealers in this city. No. 1 was of a light color with a yellowish green shade, a strong sweetish odor and almost tasteless, soluble in alcohol, ammonia water (1 part in 50) and oil of turpentine, and insoluble in benzol. No. 2 and No. 3 were of a yellowish brown color, with a strong leathery odor, almost tasteless, soluble in alcohol and ammonia water, partly soluble in oil of turpentine and insoluble in benzol.

The Pharmacopœia requires that resin of scammony shall be wholly soluble in ether; and that it dissolve in solution of potassa, the heated solution not to be precipitated by the addition of hydrochloric acid in excess. No. 1 fully complied with these requirements, but specimens Nos. 2 and 3 were not wholly soluble in ether; 5 per cent. of No. 2 and 12 per cent. of No. 3 were found to be insoluble. These last two specimens were soluble in solution of potassa, but on adding an excess of hydrochloric acid to the warm solution precipitation resulted. The insoluble portion of the last two specimens in ether would indicate the presence of jalap. Starch was also tested for, by adding some of the resin to hot water, cooling and adding a solution of iodine, but no evidence of such was obtained.

All the specimens were free from resin of guaiac, as was indicated by not obtaining a blue color when the alcoholic solution was added to the fresh-cut surface of a potato.

Resin or colophony was sought for by the addition of sulphuric acid, which should give a red color immediately on adding to the resin. There was no immediate change produced with No. 1, but with Nos. 2 and 3, the acid produced immediately a dark reddish-brown color. Negative tests were also obtained for calcium carbonate. The ash of specimen No. 1 was 0.8 per cent.; of No. 2, 0.6 per cent., and of No. 3, 0.6 per cent.

The conclusions from this investigation are that a resin of scammony may be obtained in this market which meets all the tests of the Pharmacopœia, but that the most of that used does not fully comply with the requirements of our national standard.

THE ACTION OF HYDROGEN PEROXIDE UPON METALLIC SALTS.

BY FRANK X. MOERK, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.
No. 103.

Read at the Pharmaceutical Meeting, February 16, 1892.

The prescription submitted at one of the recent Pharmaceutical Meetings, led me to make some experiments to ascertain the reaction taking place, and later to extend the investigation so as to embrace the above title. The prescription in question was as follows: Tr. Ferri chlorid., f3 ss (2 cc.); glycerin., f3 ij (8 cc.); hydrogen. peroxid. f3 vi (24 cc.). The materials were mixed in a two-ounce bottle and then tightly stoppered with a perforated cork, through which was inserted a thermometer (this experiment was made after a preliminary experiment proved it to be entirely safe); there was noticed an immediate deepening of the color after mixing; starting with an initial temperature of 29° C., the heat developed was recorded at intervals, the thermometer indicating after 5 minutes 33° C., after 10 minutes, 39° C., after 15 min., 54° C., after 18 min., 64° C., and then the temperature decreased until after 75 minutes the initial temperature was again recorded; the color had changed to a light yellow; upon removing the stopper it was found that no pressure existed in the bottle, but that there was a pronounced odor of

aldehyde and acetic ether. Upon testing the character of the iron salt after the mixture cooled there was found to be present only ferric salt; should the test be made before the mixture cools, or, if, after having cooled, the mixture be warmed again, there will be produced a dark blue precipitate, which might be taken as an indication of ferrous salt (this behavior was explained by subsequent experiments; the hydrogen peroxide is not completely reduced unless a sufficient quantity of ferric chloride is present, in which case the undecomposed hydrogen peroxide, aided by heat, reduces the reagent used for the detection of the ferrous salt, potassium ferricyanide, to potassium ferrocyanide and this then gives a dark blue precipitate with the ferric salt present). If to a portion of the solution ammonia be added in excess, the precipitate collected upon a filter, washed several times with distilled water, redissolved in dilute hydrochloric acid and then tested with potassium ferricyanide only the brown coloration due to ferric salts is obtained. If the solution be kept for a few days and then examined by addition of ammonia, there will be produced a clear greenish solution which, upon standing, will show a brownish coloration upon the surface, and only after some time will there be produced a precipitate; this precipitate collected, washed, dissolved in dilute acid and tested with potassium ferricyanide will give a very decided dark-blue precipitate indicative of ferrous salt. The above method was used to remove the undecomposed H_2O_2 so that this could not interfere with the test. From these experiments it will be seen that the ferric salt is not immediately reduced to ferrous salt, and that the ultimate reduction is probably due to the reducing action of alcohol or aldehyde since tincture of iron, after standing some days, also gives a test for ferrous salt.

Further experiments proved that alcohol and glycerin, either alone or mixed, had no action upon the hydrogen peroxide, but that the tincture of iron with the hydrogen peroxide gave the same results as recorded; this clearly indicated that the ferric chloride and hydrogen peroxide were the reacting ingredients. Using the ferric chloride solution with hydrogen peroxide it was noticed that heat was also generated and that a considerable quantity of a gas was liberated which, by causing a spark on a taper to burst into flame, was proven to be oxygen. It now became a matter of interest and importance to determine the volume of liberated oxygen

for this purpose it was not convenient to measure the evolved gas but the more convenient plan was followed of allowing the gas to displace water and, after the cessation of the reaction, to measure the water displaced. Two wide-mouth bottles were arranged for this; one, a four-ounce bottle used as a generator was fitted with a singly perforated cork, through which passed a piece of glass tubing; the other, an eight-ounce bottle filled with the water to be displaced, was fitted with a doubly perforated cork containing two pieces of glass tubing (one of which by a short section of rubber tubing was connected with the generator; to the other was connected a piece of rubber tubing so that this reached to the bottom of an eight-ounce beaker). 24 cc. hydrogen peroxide were placed in the generator; one cc. solution of ferric chloride (U. S. P.) was measured into a one drachm homœopathic vial and this placed upright in the generator so that the two solutions could not mix; before corking the generator a little of the water from the 8 oz. bottle was allowed to run out through the rubber tubing so that the latter was completely filled with water; after corking and ascertaining that the connections were tight, the rubber tubing from the eight-ounce bottle was introduced into the dry beaker and then the ferric chloride solution and hydrogen peroxide allowed to mix by tilting the generator. The deepening in color is also noticeable in this case; after a few minutes gas bubbles are seen to escape and the mixture becomes warm (the heat developed in this reaction is, however, not so great as in the presence of alcohol); agitation favors the evolution of the gas and the reaction is then complete in from one to one and a half hours; after allowing to cool the displaced water measured 182 cc. The examination of the solution for iron salts gave the same results as in the case of the prescription. The changes taking place in the prescription are, therefore, as follows: The deepening of the color is due at least in part to the elevation of temperature (if the mixture after cooling be warmed again there will be produced a distinct deepening of the color), and the latter is due in part to the liberation of oxygen from the hydrogen peroxide caused by the decomposing action of ferric chloride (this salt, however, is not in any way changed), and in part to the oxidation of the alcohol to aldehyde and acetic acid by the nascent oxygen. The presence of alcohol in the tincture of iron, therefore, accounts for the difference in action between the tincture of iron and solution of iron upon hydrogen peroxide.

To ascertain the conditions under which the hydrogen peroxide is completely decomposed by ferric chloride, the following experiments were made. First the hydrogen peroxide was standardized. [Several methods have been proposed for the estimation of this compound:

(1) By the action of potassium permanganate and sulphuric acid; in this method the excess of permanganate can be estimated with oxalic acid or the liberated oxygen can be measured, one-half of which comes from the permanganate, the other half from the H_2O_2 .

(2) By the action of bleaching powder; in this case the evolved oxygen is measured, one-half coming from the H_2O_2 according to the reaction, $\text{CaOCl}_2 + \text{H}_2\text{O}_2 = \text{Ca Cl}_2 + \text{O}_2 + \text{H}_2\text{O}$.

(3) By the liberation of iodine from potassium iodide and sulphuric acid and titrating this with sodium thiosulphate.] For my purpose it was more convenient to use the officinal solution of chlorinated soda; the reaction, besides being complete in a few minutes, is a cleanly one.

10 cc. solution of chlorinated soda were placed in the generator and 2.5 cc. H_2O_2 in the homœopathic vial; after connecting as described and allowing the two liquids to mix, 53 cc. water were displaced; using 15 cc. solution of chlorinated soda and 2.5 cc. H_2O_2 , 55 cc. water were displaced; this estimation is based upon the equation: $\text{NaClO} + \text{H}_2\text{O}_2 = \text{NaCl} + \text{H}_2\text{O} + \text{O}_2$, from which it will be seen that one-half of the oxygen only comes from the H_2O_2 , therefore 2.5 cc. H_2O_2 liberated 27.5 cc. oxygen, making the H_2O_2 used an eleven volume solution (the H_2O_2 was taken from a freshly-opened bottle labelled 15 volume). The 24 cc. used with the ferric chloride in the above-mentioned experiment should have liberated 264 cc. oxygen, but as only 182 cc. were liberated it shows the incompleteness of the reaction.

(1) 5 cc. H_2O_2 with 5 cc. Fe_2Cl_6 solution (5 per cent.) liberated 45 cc. oxygen.

(2) After the preceding reaction was complete, 5 cc. more H_2O_2 were added; 44 cc. oxygen were liberated.

(3) Upon the further addition of 5 cc. H_2O_2 , only 35 cc. oxygen were evolved, showing the important fact that the more dilute the ferric chloride solution, the less oxygen is liberated.

(4) By adding solution of chlorinated soda to (3) oxygen was given off, but unfortunately the quantity added was not sufficient to com-

pletely decompose the remaining H_2O_2 , so that this experiment cannot be stated quantitatively.

(5) 5 cc. H_2O_2 with 5 cc. $\text{Fe}_2 \text{Cl}_6$ solution (5 per cent.) at a different time gave 45 cc. oxygen.

(6) 5 cc. H_2O_2 with 10 cc. $\text{Fe}_2 \text{Cl}_6$ solution (5 per cent.) evolved 50 cc. oxygen.

(7) 5 cc. H_2O_2 with 5 cc. $\text{Fe}_2 \text{Cl}_6$ solution (U. S. P.) evolved 55 cc. oxygen, showing in this case complete decomposition; this experiment does not prove the absolute quantity of ferric chloride (which must vary according to the strength of the H_2O_2) necessary for the complete decomposition of the 5 cc. H_2O_2 , but proves the fact that the decomposition can be made complete under the proper conditions.

A large number of experiments were now made to ascertain the action of other salts upon hydrogen peroxide; these were not made quantitatively but simply carried out as test-tube experiments to determine if decomposition resulted.

Before giving these results the known reactions and behavior of H_2O_2 may be stated: When concentrated it is readily reduced by finely divided silver, gold and platinum without oxidizing these metals; selenium, chromium and arsenic are oxidized to form acids. In dilute solution it is reduced by the oxides of silver, gold, platinum and mercury; these oxides also being reduced to metal. In alkaline solutions manganous salts are oxidized to manganic oxide; in acid solutions peroxides are reduced to mon-oxides (MnO_2 , $\text{K}_2\text{Mn}_2\text{O}_8$, PbO_2). Potassium ferricyanide is reduced to potassium ferrocyanide; metallic sulphides are oxidized to sulphates. Sulphurous acid is converted into sulphuric acid; HCl and HI are decomposed with liberation of chlorine and iodine respectively. Other reactions which are used as tests for hydrogen peroxide are: The addition of ether to an acidified solution of H_2O_2 followed by a few drops of dilute potassium chromate solution will, after agitation, impart to the ether a beautiful blue color (generally stated to be due to the formation of perchromic acid); uranium nitrate is said to be a better test than the chromate. Potassium iodide and starch slowly give the blue color of iodide of starch (ozone or chlorine cause an immediate blue color). If to the previous test a little ferrous sulphate be added, it forms the most delicate test for H_2O_2 (one part in twenty-five million parts can still be detected). With naphthylamine and sodium chloride a blue color is produced.

Titanic, molybdic, tungstic and vanadic acids in presence of H_2SO_4 give yellow or orange colored solutions. Thallous oxide becomes brown, due to formation of thallic oxide. Indigo solution is decolorized after addition of FeSO_4 . Guaiac solutions become blue after the addition of FeSO_4 (distinction from ozone and chlorine).

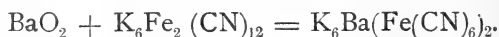
Hydrogen peroxide has been proposed as a test for molybdenum, molybdates in acid solution becoming deep yellow (claimed to be due to the formation of a higher oxide). In quantitative analysis it is used in the oxidation of ferrous salts; in the separation of manganese from zinc, cobalt and nickel; of zinc from cobalt and nickel and in the determination of potassium permanganate, of bleaching powder, of potassium ferricyanide, of potassium chromate, of manganese dioxide, of lead dioxide.

Hydrogen peroxide, in alkaline solutions, speedily decomposes, and is more permanent in acid than in neutral solutions; all mineral salts excepting the alkaline chlorides, nitrates and sulphates, and mercuric chloride have a decomposing effect; the addition of alcohol, ether, phenol, thymol, menthol to nearly neutral solutions have a preservative effect. In a paper published by Dr. G. Kassner (abstracted in the *Am. Journ. Pharm.*, 1889, 565) "the preparation of oxygen is described from potassium ferricyanide and hydrogen peroxide in the presence of potassium hydrate. The statement is there made that the reaction progresses only in alkaline solution, and that as soon as the potassium hydrate is used up in the formation of potassium ferrocyanide, according to the reaction:



the evolution of oxygen ceases, but that the liberation of oxygen will continue upon further addition of KOH as long as both H_2O_2 and $\text{K}_6\text{Fe}_2(\text{CN})_{12}$ remain."

A brief abstract of a very recent article by W. Kwasnik, "The action of barium peroxide upon metallic salts," *Arch. der Pharm.*, 1891, 573, may prove interesting for comparison: "This study was incited by the process of Dr. G. Kassner for making oxygen from barium peroxide and potassium ferricyanide: taken in molecular proportion and covered with water, these materials will give up oxygen in the cold, the ferricyanide being reduced to ferrocyanide according to the reaction:



The barium peroxide was allowed to stand with water to form the hydrated peroxide which was found to be more energetic in its action.

With Fe_2Cl_6 oxygen was liberated but without the reduction of the ferric salt; tried under various conditions the same results were obtained. Salts of potassium, sodium, lithium, ammonium, barium, strontium and calcium have no action upon BaO_2 ; magnesium salts will very slowly reduce BaO_2 , liberating oxygen; zinc and cadmium salts act better but still only moderately upon BaO_2 ; nickel and cobalt salts produce a rapid liberation of oxygen, the hydrates of the metals being precipitated. Ferric, chromium, aluminium and manganous salts react like ferric chloride in rapidly liberating the oxygen, so that if the mixtures be agitated, the reaction is complete in a few minutes, ferrous salts are first converted into ferric salts and then oxygen is liberated. Cupric salts liberate oxygen without reduction to cuprous salts. Mercuric, silver and gold salts, in presence of excess of BaO_2 liberate oxygen and are reduced to metal. Platinic chloride shows a different behavior dependent upon the form in which it is taken; if as H_2PtCl_6 (commercial solution of platinic chloride), oxygen will be liberated but no separation of the metal takes place; if PtCl_4 be taken (by removing the HCl by addition of AgNO_3) oxygen is also liberated but metallic platinum separates. In these several experiments it was noticed that any salt of the metal could be taken, no matter if soluble or insoluble (in the latter case heat had to be employed at times to start the reaction)."

In the following experiments aqueous solutions of the different salts were used; where acid solutions were used these will be mentioned especially.

The action of H_2O_2 upon *potassium ferricyanide*, owing to the difficulty described in testing for ferrous salt in presence of ferric salt, was first investigated: A freshly prepared solution (which with ferric chloride gave only a brown coloration indicating the absence of ferrous salt and of potassium ferrocyanide) was used; if to a little of this solution a single drop of H_2O_2 was added and this mixture immediately added to some of the ferric chloride, a greenish coloration was at once produced and after standing a few minutes a dark blue precipitate separated. This proves that H_2O_2 even in the cold may reduce potassium ferricyanide to potassium ferrocyanide

and this latter reagent then produces the precipitate with the ferric salt. If equal quantities of H_2O_2 and $\text{K}_6\text{Fe}_2(\text{Cu})_{12}$ solution be allowed to stand, there will be noticed after a few minutes an evolution of oxygen, showing that the reduction takes place in *neutral* or even acid solution, as another experiment proved; upon the addition of an alkali or alkaline carbonate the decomposition is hastened, the solution taking the *yellow* color of potassium ferrocyanide; by allowing the reaction to proceed for some time the mixture becomes almost *colorless*, but will still give the tests for ferrocyanide after acidifying.

Potassium ferrocyanide with H_2O_2 , also causes, in cold neutral solutions the evolution of oxygen; in alkaline solutions the reaction proceeds more rapidly and here again an almost colorless solution results. No explanation of the decolorization can as yet be given.

Ferrous sulphate, with a few drops of H_2O_2 , becomes quite dark brown in color without evolution of oxygen; upon addition of more H_2O_2 , oxygen is liberated and a precipitation of a basic salt takes place (this is soluble on addition of HCl). By precipitating a portion of this test with ammonia, collecting, washing, dissolving in HCl , and adding potassium ferricyanide, only ferric salt was found present. If to the mixture of ferrous sulphate and hydrogen peroxide a little alcohol be added, there will be developed after a time the aldehyde odor; in this respect there is perfect analogy between ferrous sulphate and ferric chloride). It may be mentioned here that the oxidation of ferrous salts appears to take place more readily in neutral or alkaline solution than in acid solution.

Magnesium sulphate, zinc sulphate, alum, cobaltous nitrate, nickel nitrate, mercuric chloride, copper sulphate, bismuth nitrate (in HCl) *cadmium nitrate, stannic chloride* (in HCl) and *arsenious oxide* gave no evolution of oxygen after standing as long as twenty-four hours. The addition of a few drops of NaOH liberated oxygen with only the following: Cobalt nitrate with separation of black cobaltic oxide; nickel nitrate with separation of green nickelous hydrate; mercuric chloride with only a few drops of NaOH causes but a slight effervescence and separation of oxychloride; if, however, sufficient NaOH is added to change the oxychloride into oxide, then the reaction is energetic, and the oxide is reduced to the metal; copper sulphate with separation of cupric oxide; bismuth nitrate, cadmium nitrate and stannic chloride with separation of the white hydrates; arsenious

oxide or acid with formation of arsenic acid. The addition of an excess of NaOH to these several salts caused in every case the liberation of oxygen, and it is to be noted that when a small quantity of NaOH caused the reaction, the addition of an excess notably hastened the same. It is doubtful if the salts only acting with the excess of NaOH really bring about the decomposition or if this is due to the alkali itself, as it was subsequently proven that the alkaline hydrates and carbonates caused the evolution of oxygen from the hydrogen peroxide.

Stannous chloride develops considerable heat due to the oxidation to stannic chloride; any excess of H_2O_2 then reacts with SnCl_4 as stated above.

Chrome-alum, cerous chloride, and manganous sulphate, after some time slowly liberate oxygen; the addition of alkali hastens the decomposition; with an excess of alkali, chromic hydrate is oxidized to chromic acid, cerous hydrate to yellow ceric oxide, manganous hydrate to dark brown manganic hydrate. If a little of the chromate solution, obtained as above, be covered with ether, then a drop of dilute sulphuric acid added and agitated, the ether will become beautifully blue in color, due to the formation and solution of perchromic acid. It is therefore possible to successively oxidize chromic salts to chromic and perchromic acids; on the other hand, a chromate in acid solution is reduced to a chromic salt.

Lead acetate forms after a few minutes a whitish turbidity, later a yellowish white precipitate separates and the liquid effervesces; the addition of a drop of NaOH causes a bright red precipitate and lively effervescence; upon agitation the color of the precipitate changes to pale yellow; if an excess of NaOH be added there is formed a heavy dark brown precipitate, which after standing becomes of a distinct red-brown color (due to formation of some lead dioxide).

Auric chloride liberates oxygen while metallic gold separates.

Platinic chloride (commercial solution) liberates oxygen, the solution remaining yellow in color and transparent; the addition of NaOH causes the oxygen to be liberated more rapidly, but also without precipitation. A mixture of platinic chloride and silver nitrate solutions will only slowly evolve oxygen from H_2O_2 ; but the addition of a few drops NaOH will cause immediate reaction with separation of metallic silver and platinum.

Silver nitrate with H_2O_2 forms a white precipitate insoluble in

nitric acid, soluble in ammonia, showing the presence of chlorides or of hydrochloric acid (the solution of H_2O_2 has a slight acid reaction). Only after standing for a number of hours will this turbid mixture show signs of decomposing H_2O_2 , but the addition of a few drops NaOH will cause the speedy decomposition with separation of metallic silver. If the silver nitrate be added in excess and the silver chloride filtered off, the filtrate will not even after standing twenty-four hours show any signs of decomposition.

The experiments made in alkaline solution show that hydrogen peroxide under these conditions is decomposed like the barium peroxide. The experiments also show that a number of metallic salts will decompose H_2O_2 even in neutral or acid solution; it is therefore evident that in the prescribing and dispensing of H_2O_2 this ready decomposition of the compound must be remembered; also that it will not do to prescribe and dispense H_2O_2 in what may seem to be desirable combinations unless experiment proves the combination practicable.

The above behavior of silver nitrate and hydrogen peroxide caused an examination for foreign matter to be made in the latter, with the following results: 20 cc. (weighing 20.252 gm.) gave a precipitate of silver chloride, weighing 0.03443 gm., calculating this to officinal hydrochloric acid, it will equal 0.137 per cent.; 20 cc. evaporated upon a water-bath until only a few milligrams difference was noticed between two weighings, left a syrupy liquid weighing 0.143 gm. or about 0.7 per cent., giving with borax a green flame indicating glycerin; the taste of this residue somewhat reminded of the hypochlorites; the sweet taste of glycerin was not prominent but the sensation of warmth as given by the latter was recognizable. By treating the residue with baryta water, evaporating to dryness, extracting with ether-alcohol and again evaporating, a residue was obtained possessing the sweet taste of glycerin. Upon evaporating 20 cc. to dryness and heating, it was noticed that the fumes given off burnt with a green flame, indicating the presence of boric acid or a borate; after two days' heating the residue was still black, so that it was not possible to determine the ash in the H_2O_2 , but the residue treated with a little water gave a flame test for sodium. The H_2O_2 had an acid reaction and evidently the addition of hydrochloric acid, boric acid or borax, and glycerin was for their preservative action.

PRACTICAL NOTES.

ABSTRACTS FROM THESES.

Extractum Dicteræ Fluidum.—Chas. E. Hammerquist made a number of comparative experiments with the view of determining the best menstruum for fluid extract of Turkey corn. The one directed by the "National Formulary," viz: 3 vols. of alcohol and 1 of water, yields a good fluid extract in which, however, some precipitation takes place. If prepared with alcohol the fluid extract was lighter in color, and less bitter, but remained clear. Made with a menstruum of 4 vols. of alcohol and one of water, a clear fluid extract was also obtained, and proved to be satisfactory in all respects. Other menstrua gave less satisfactory results than the above.

Extractum Glycyrrhizæ Fluidum.—The disagreeable and unsightly preparation of the pharmacopœial preparation suggested to Albert G. Reizenstein, the desirability of changing the menstruum or the manipulation, or both, and the objection appears to have been removed by making one pint of the preparation as follows: Moisten the drug in No. 40 powder ($16\frac{2}{3}$ oz.) with 16 fluidounces of water, containing $\frac{1}{2}$ fl. oz. of water of ammonia; pack moderately tight in a cylindrical glass percolator, and exhaust the drug by percolation with more of the same menstruum; heat the percolate and keep it boiling for about ten minutes, adding some water if it should become too thick; set aside to cool, then filter, and wash the mass on the filter with cold water, evaporate the filtrate to 12 fluidounces and add 4 fluidounces of alcohol. The fluid extract is very sweet and is destitute of the bitter aftertaste of the pharmacopœial preparation. The most troublesome part of the process is the manipulation of the precipitate produced on boiling, which appears to be albumen colored with glycyrrhizin to a slight extent, and which is liable to clog the pores of the filter.

Emulsio Olei Morrhuæ.—The following formula is suggested by Oliver Stout for preparing an emulsion containing 50 vol. per cent. of cod-liver oil: Triturate 1 oz. of glyconin with 2 oz. of cod-liver oil, gradually added, until emulsified; dissolve 60 grains of ammoniated glycyrrhizin in water, and add this solution gradually, followed by water, to the emulsion until four fluidounces are obtained. The glycyrrhizin masks the taste of the oil without any further addition. Hypophosphites may be added with the water.

Syrupus Benzoini.—Francis F. French considers the following to be the best process for preparing this syrup: Prepare a tincture from 2 drachms of benzoin with sufficient alcohol, evaporate to a small bulk; add talcum 3ij, also a little sugar, afterward 4 fl. oz. of water; filter and dissolve in the filtrate 6 oz. of sugar. (See also Am. Jour. Phar., 1891, p. 187).

After having made satisfactory syrups of benzoin by several formulas, Wm. E. Gosh comes to the conclusion that it is an unnecessary preparation, being not as pleasant as syrup of tolu, and not possessing any medicinal properties superior to those of the latter.

Suppositoria Glycerini.—For preparing suppositories containing 90 per cent. of glycerin Geo. W. Hackenberger recommends triturating 4 p. exsiccated sodium carbonate and 2 p. powdered castile soap with 90 p. glycerin, and heating over a water-bath until free from foam, then add 4 p. stearin, again heat until free from foam, strain and pour into moulds.

For 50 per cent. glycerin suppositories mix glycerin 250 p. and water 200 p.; triturate with powdered castile soap 20 p. and exsiccated sodium carbonate, heat over a water-bath as stated before, add stearin 15 p., again heat and strain. The addition of soap is considered an improvement over other formulas. Formulas for glycerin suppositories made with soap were also published in Amer. Jour. Phar. 1888, p. 560, and 1889, p. 80.

ABSTRACTS FROM FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

Digitaleïn.—Schmièdeberg divides the active constituents of digitalis into two classes, one soluble and the other insoluble in water. He furthermore separated the soluble digitalin into two bodies, digitonin and digitaleïn, by means of absolute alcohol. J. Houdas (*Compt. rendus*, 1891, cxiii, 648) concludes that there is only one compound in the soluble digitalin, viz: digitaleïn. He endeavored to separate this body, according to Schmièdeberg, by treatment with absolute alcohol and precipitation with ether, but found that the crystals obtained from the solution were identical with the portion remaining undissolved. The most characteristic property of digitaleïn is that on adding to the aqueous solution an alcohol of the fatty series, a crystalline compound, consisting of the

alcohol and hydrated digitalein, is formed, the solubility of which is inversely to the molecular weight of the alcohol used. The body obtained with ethylic alcohol loses its alcohol and water at 110° C. (230° F.) Digitalein is slowly soluble in cold water, and rapidly so in hot water; this solution does not yield a crystalline product. At 250° C. (482° F.) digitalein cakes together, at 270° C. (516° F.) decomposition begins, and at 280° C. (536° F.) caramelization is complete. The aqueous solution is precipitated by tannin and ammoniacal lead acetate. On careful treatment with dilute acids the author obtained from digitalein two other glucosides without the appearance of glucose.

Morphine and narcotine in opium.—Adrian (*Four. Pharm. Chim.*, 1891, xxiv, 526) estimated the amounts of these two alkaloids in 38 samples of opium. The percentage of morphine varied from 6.75 per cent. to 12.15 per cent., in quite a number of cases being 8–9 per cent., the normal being about 10 per cent. Narcotine varied even more than morphine, the normal percentage being 2.5 per cent. One sample showed as high as 3.97 per cent., while two others showed 0.5 and 0.1 per cent., respectively. The sample with 0.1 per cent. of narcotine contained 10.075 per cent. of morphine, and the one with 3.97 per cent. of narcotine, 9.7 per cent. of morphine.

Antidote for morphine.—Kossa (*Monit. Pharm.*, Dec. 1891, p. 1007), through experiments with lower animals, finds that administration of picrotoxin and paraldehyde at the same time had the desired effect. The paraldehyde was given to counteract the contraction of the respiratory muscles produced by the picrotoxin. The latter alone does not act as an antidote in morphine poisoning.

Disinfectol is stated to be an energetic disinfectant, similar to lysol and creolin (see *Am. Jour. Phar.*, 1890, p. 342; 1891, p. 93). It is a brown-black oily liquid, of an alkaline reaction, and of the spec. grav. 1.086, and besides hydrocarbons contains sodium carbolate and resin soaps.—*Four. Méd., Chir., Phar.*, Nov., 1891.

Sulphaminol.—Wojtaszek (*Przegląd Lekarski* Aug. 8, 1891), experimented with this new antiseptic, sulphaminol or *thioxydiphenyldiamine*, proposed by Merck, but does not arrive at the same conclusions as this investigator. Hypodermic injections of 3 to 4 gm. to the kilo of the animal (rabbit), produced no effect, but like

foreign bodies became encapsuled after a few days. Exhibited by the mouth it is totally eliminated with the fæces. Antiseptic effects also could not be observed.

Exhibition of cod liver oil.—*Revue de Thérapeutique* (1891, p. 641) advises a mixture of equal parts of cod liver oil and lime water as a manner of exhibiting cod liver oil in a form which is borne by a delicate stomach. The mixture is milky, syrupy and inodorous; it does not develop a rancid and repugnant aftertaste. The assimilation is said to take place readily. For analogous combinations of the oil with alkalies or earths, see *Amer. Jour. Phar.*, 1852, 172; 1856, 1; 1889, 517.

Purity of strontium salts.—Patein (*Revue Thérap.*, 1892, p. 13) proposes the following reaction for testing the purity of strontium salts, which are being used in cases of diabetes: (1) To a saturated solution of the salt two or three drops of a solution of bichromate of potassium are added. The solution should remain clear for at least 24 hours; 0.01 gm. BaCl in 10 cg. causes a precipitate. (2) To a very dilute solution of the salt two or three drops of neutral chromate of potassium are added; the liquid should remain clear for several minutes. For purifying the strontium salts the author proposes adding a few drops of dilute sulphuric acid (1-10) to a saturated solution of the salt to be purified.

Uses of strontium bromide.—In a discourse before the Academy of Medicine, Prof. Séé reported (*Progrès Méd.*, Oct. 31, 1891) that the diuretic properties of strontium salts observed by Dr. Laborde in the dog (see *Amer. Jour. Phar.*, 1891, p. 129), were not observed in the human subject; but that he had seen notable improvement of the digestive disturbances in patients suffering from diseases of the heart and kidneys. In daily doses of 2 to 4 gm. administered at meal time, strontium bromide afforded decided relief in cases of dyspepsia, and the salt was also found useful in Bright's disease. At a meeting of the Biological Society, Dr. Fréré stated that strontium bromide, owing to its being well tolerated by the stomach, may be used in place of potassium bromide.

Strontium lactate may be made from lactic acid and strontium carbonate. Dr. C. Paul considers this salt to be of decided advantage in rheumatic parenchymatous nephritis, in scrofulous and gouty nephritis and in albuminuria of pregnant and puerperal women,

the secretion of albumin being rapidly decreased to one-half. *Progrès Méd.*, November 21, 1891.

Action of barium chloride.—Dr. Bardet reported to the Société de Thérapeutique (*Progrès Méd.*) the death of a woman from a dose of 4 grams of this salt. Barium chloride causes coagulation of the blood and this occasions embolism resulting in death.

Solution of bismuth chloride.—H. Causse (*Compt. rend.*, cxiii, 1891, 547) prepares a neutral solution of bismuth chloride by use of a saturated solution of sodium chloride. Contact with water decomposes bismuth chloride, but in the presence of free acid this decomposition does not take place. Ammonium chloride can be used instead of the free acid to prevent the decomposition of the bismuth salt; sodium chloride has the same effect. A solution of this kind can be used for preparing *basic bismuth salicylate*, the author's process being as follows: 35 gm. bismuth oxide are dissolved in 40 cc. concentrated hydrochloric acid and then mixed with 500 cc. of a saturated solution of sodium chloride. To this mixture is then added either bismuth carbonate or oxide, as much as will be dissolved, or a saturated solution of sodium chloride and carbonate in such quantity that the precipitate, which is at first dissolved, becomes permanent. To 500 cc. of a solution of sodium chloride are added 9 gm. sodium hydrate and 22 gm. sodium salicylate, the solution is filtered and then added to the first, when bismuth salicylate is precipitated. This is collected on a filter and washed with water acidified with a few drops of nitric acid until the filtrate is colorless. Bismuth salicylate forms microscopic crystals, which are decomposed by heat, and from which alcohol takes the acid.

Lead poisoning from wall-paper.—A case is reported by Dr. Guyot (*Jour. de Méd.*, Nov. 26, 1891) in which no other cause could be assigned for the plumbism, except the large proportion of lead compounds found in the wall-paper of the bed-room.

Boric acid in vegetables.—A. Gassend reports (*Ann. agronom.*, xvii, 352) having found from 5 to 10 milligrams of boric acid per liter in a large number of South European wines. Treating the ash of 10 cc. of wine with alcohol and sulphuric acid, the green flame is not produced, but the boric acid is readily recognized by turmeric paper and by means of the spectroscope. Traces of this acid were also determined in grapes, apples, certain pears, potatoes, radishes and lettuce, but not in tea, saffron or cow's milk.

Oil of linden seed.—According to C. Mueller (*Ann. agronom.*, xvii, 431), the seeds of the European lindens (*Tilia platyphylla*, *ulmifolia* and *intermedia*) contain, besides little starch, about 58 per cent. of a yellow bland non-drying oil, which does not solidify at -21.5°C. , does not become rancid, and resembles an excellent quality of olive oil. Sulphuric acid causes a dark brown red color, and a considerable rise of temperature.

Iodoform injection.—Dr. P. Thierry (*Semaine Méd.*) has found an injection composed of iodoform 10 gm. and expressed oil of almond 60 gm., useful in the acute stage of gonorrhœa. The injection should be retained for at least ten minutes.

Helenin is stated to be a valuable remedy in certain forms of leucorrhœa, being given in daily doses of 0.05 gm. Occasionally colic and diarrhœa are observed, but no other ill effects.—*Jour. de Méd.*

Commercial Peptones.—Van de Velde (*Ann. Soc. méd. d'Anvers*, Nov., 1891) examined three commercial peptones, viz: Cornelis, Kemmerich and Denaeyer's, the results being given in tabular form:

	Cornelis.	Kem- merich.	Denaeyer	
(A) Precipitated by alcohol, gm.	35.886	47.567	68.9	Albumin, gelatin, albuminose and peptone.
(B) Soluble in alcohol, .	58.936	43.333	19.43	Extractive principles almost 20 per cent.; decomposition products of gelatin and albumin.
(C) Ash,	5.178	9.1	11.67	Incineration of A.
(D) Albumose and peptone.	15.121	peptone absent.	61.118	Determined with corrosive sublimate in the solution of A, (gelatin not being precipitated).

Naphthalin as a tænifuge.—Dr. Mirovitch (*Sem. Méd.*) gives naphthalin in the following mixture to children. Naphthalin 0.3-0.5 gm.; castor oil 15 gm.; oil of bergamot 11 drops. To be given fasting. Adults should take 1 gm. naphthalin and follow with 30

gm. castor oil. Two days before treatment, pickled, sour and spiced victuals should be taken.

Antipyrin in infantile diarrhœa.—Dr. Saint Philippe (*Jour. Méd. de Bordeaux*) uses solutions of antipyrin in cases of this kind. For children from 1 to 6 months, $\frac{1}{2}$ per cent.; of one year 1 per cent., and of 2 or 3 years, $1\frac{1}{2}$ per cent. solution of antipyrin are used, the dose being a coffee-spoonful every two hours.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

Exodyne, an American antipyretic, according to an analysis made by Dr. F. Goldmann, contains approximately 90 per cent. acetanilide, 5 per cent. sodium salicylate and 5 per cent. sodium bicarbonate; alkaloids could not be detected in this mixture.—*Pharm. Zeitung*, 1892, 39.

Quickine, an American antiseptic, contains one part carbolic acid and 0.02 parts mercuric chloride in 1,000 parts of a mixture of alcohol and water.—*Pharm. Zeitung*, 1892, 40.

The purification of resinified essential oils is best effected by neutralizing with sodium carbonate and distilling in a current of steam; the oil will be almost pure, but may have a yellowish color. To remove the color and to obtain the oil perfectly pure, it is placed in a flask with several pieces of stick potash, warmed to 50–60° C., allowed to stand over night and then distilled over a naked flame; bumping is prevented by adding a minute quantity of talc to the oil before distilling.—Dr. H. Werner, *Pharm. Zeitung*, 1892, 39.

Thymacetin is a compound related to thymol in the same manner as is phenacetin to phenol; it has the formula $C_6H_2(CH_3)(C_3H_7)(OC_2H_5)NHC_2H_5O$. It forms a white crystalline powder only slightly soluble in water; in doses of 0.25 to 1.0 gm., it generally relieved nervous headaches and occasionally acted as a hypnotic.—*Pharm. Zeitung*, 1892, 40.

Tests for fixed oils.—Dr. Holde states that of the numerous tests proposed for the identification of fixed oils in admixture, there is only one the reliability of which has not been questioned, namely, the test for sesame oil with hydrochloric acid and sugar (formation of a red color).—*Pharm. Zeitung*, 1892, 40.

The active principle of the Borragineæ.—The roots, stems, leaves and seeds of *Heliotropium europæum* and of *Cynoglossum officinale* were examined. By hot extraction of the roots with petroleum-ether there was extracted, especially from the cynoglossum, a red coloring principle, which by spectroscopic examination was proven to be identical with the coloring matter from alkanna. By extracting the residue with alcohol and evaporating, a mixture of wax and alkaloid was obtained; the latter was separated by treatment with dilute sulphuric acid and the solution supersaturated with ammonia yielded the alkaloid to chloroform. The roots after treatment with alcohol had lost all the bitter taste. The stems and leaves treated in the same manner failed to give indications of alkaloids. The seeds by the same treatment yielded the same alkaloid as the roots. The alkaloids extracted from the two plants are identical: it is hygroscopic; its salts are uncrystallizable and are readily decomposed at 100° C. and even at normal temperatures after some time. The alkaloid gives precipitates with the alkaloidal reagents; with concentrated sulphuric acid it becomes yellow, changing to a red; the addition of oxidizing agents does not produce characteristic colorations. Physiological experiments did not show the curarine-like effects, as has been announced by other investigators. The name *cynoglossine* is proposed to be retained for the alkaloid, no matter from which source it is obtained.—Prof. F. Schlagdenhauffen and E. Reeb, *Pharm. Post*, 1892, 1.

The examination of urine for sugar frequently gives negative tests with Fehling's solution in the presence of sugar, because of the presence of interfering substances. Dr. G. Vulpius recommends the following method of applying the test: In two test tubes are placed 5 cc. diluted Fehling's solution and heated to the boiling point; to one of these is added one cc. of the urine, to the other one cc. of a mixture of equal volumes of urine and 1 per cent. glucose solution, and the tests again heated to the boiling point. Should neither test show indications of reduction it proves the presence of interfering substances, and other tests for sugar must be applied; if the test with the urine is negative while the one containing the glucose is positive, it indicates the absence of interfering substances and of sugar in the urine so that no further tests need be applied.—*Pharm. Post*, 1892, 7.

Antipyrine benzoate is prepared by adding antipyrine to a boiling solution of benzoic acid; it melts below the boiling point of water, forming a yellow liquid which solidifies to an opaque, crystalline mass; from alcoholic solution it is obtainable in small crystals. It is almost insoluble in hot or cold water, but is quite soluble in alcohol and ether; it has a faint odor of benzoic acid and possesses a pungent taste. *Antipyrine picrate* can be obtained in the same manner; it forms a pale yellow powder having the same solubilities but is not so fusible. Both give with ferric chloride a red coloration.—S. Cressati (*L'Orosi*) *Pharm. Post*, 1892, 93.

Hydrargyrum pyroboricum, $H_gB_4O_7$, is used to some extent in the treatment of sores; a two per cent. ointment with vaselin or lanolin as the base is the preparation generally prescribed; the salt is made by dissolving 76 gm. crystallized borax and 54 gm. mercuric chloride separately in 1,000 gm. distilled water; the solution of borax is added with constant stirring to the mercuric chloride solution, the brown precipitate formed rapidly settles and is thoroughly washed with water until the washings give no reaction with silver nitrate. It must be dried in the dark and then constitutes an amorphous brown powder, insoluble in water, alcohol or ether.—V. Tokayer, *Pharm. Post*, 1892, 156.

The alkaloids in extract of belladonna.—The experiments of Schütte and Siebert (*Am. Journ. Pharm.*, 1891, 602), proving that the alkaloids present in the belladonna leaves consist chiefly of hyoscyamine, made it an interesting point to determine if this alkaloid during the manufacture of the extract changed to atropine, since it has been found that the change can take place by heating to $100^{\circ} C$. From 10 grams of an extract, kept for about eighteen months and prepared according to the *Netherland Pharmacopœia*, the crude alkaloids were prepared and fractionally precipitated with auric chloride; the precipitates were recrystallized from acidulated water and dried at $100^{\circ} C$. The first two fractions melted at $158.5^{\circ} C$., the third at $156.5^{\circ} C$., the fourth fraction was so small that the melting point could not be determined, but under the microscope it was found to consist largely of hyoscyamine-gold-chloride, while the atropine-gold-chloride could not certainly be identified. It follows, therefore, that the alkaloid present in the extract was almost entirely hyoscyamine and that no change had

taken place during the preparation of the extract.—L. van Itallie, *Apotheker Ztg.*, 1892, 27.

An antipyrine test.—If an antipyrine solution mixed with nitric acid be heated for some time there will develop a cherry-red coloration; the intensity of the color depends upon the concentration of the antipyrine solution and the strength of the nitric acid used.—L. Van Itallie, *Apotheker Ztg.*, 1892, 28.

A sensitive test for albumin in urine.—The reagent is made by dissolving 8.0 mercuric chloride, 4.0 tartaric acid, 20.0 sugar in 200.0 water; the acid is added to produce a strongly acid solution and the sugar to increase its density. In applying the test the urine is acidulated with a few drops of strong acetic acid, filtered and delivered by means of a pipette into a tube half-filled with the reagent so as to form two layers. If the urine contains even less albumen than 1 in 50,000, there is produced immediately or before the lapse of a minute, a distinct white ring at the line of contact; the white ring is especially seen if the tube be held against a black background.—Dr. E. Spiegler, *Oesterr. Ztschr. f. Pharm.*, 1892, 65.

Tannate of quinine.—DeVrij recommends the following method of preparation: One part pure quinine is intimately mixed by trituration with four parts tannic acid, ten parts water added, dried on a water-bath at a temperature not exceeding 60° C., the residue powdered and again dried. The preparation contains 20 per cent. quinine.—(*Ned. Tijds.*) *Oesterr. Ztschr. f. Pharm.*, 1892, 67.

A new method for preparing salol-phenyl salicylate.—Wierp and Ernert have recently noticed that if salicylic acid be heated to between 160–240° C., it forms salol by loss of water and carbon dioxide, if precautions are taken to remove the water as liberated and prevent access of air. The process has been patented. The salol is purified by washing with water, or, if necessary, with soda solution and then by crystallization from alcohol or other suitable solvent.—*Pharm. Centralhalle*, 1892, 27.

Antipyrine and euphorin, when triturated together liquefy or become pasty, depending upon the proportions; in prescriptions it has been found necessary to dispense the two separately or to enclose the one prescribed in smaller quantity in a small cachet and then to enclose this in a larger cachet with the other ingredient. J. Mindes has noticed that if the euphorin be triturated with sugar

(which answers better if it be mixed with bicarbonate of soda or powdered liquorice), and this mixed with the antipyrine by using a spoon instead of a pestle, a powder is obtained that can readily be dispensed in a single cachet.—*Rundschau*, 1892, 3.

Aceta.—The observation made by Dieterich that in this class of preparations the percentage of acetic acid gradually decreases, is confirmed by M. C. Traub; accompanying this decrease of acetic acid is a change in the odor of the preparations, which is undoubtedly due to the formation of acetic ether.

Ethyl bromide.—An examination of an article made by the German Pharmacopœia process, proved that it contained an impurity which had a very irritating effect upon the nose and eyes before it was purified by treatment with sulphuric acid; by fractioning 100 kilos, there was obtained 500 grams of a difficultly volatile substance, which after purification yielded a fraction boiling at 150–151° C., and which was identified as *bromoform*; the very irritating substance was later isolated and found to be *mono-brom-acetone*. These impurities originate from an impure alcohol (*denaturized* by addition of pyridine) containing acetone, which latter is acted upon by bromine liberated from the hydrobromic acid employed. If the ethyl-bromide be very thoroughly purified by the action of sulphuric acid it can be kept for a long time, an occasional opening of the bottle not tending to decompose it; cork stoppers, however, should not be used, since this promotes decomposition.—*Schwz. Wochensch. f. Chem. u. Pharm.*, 1892, 3.

Sweetened castor oil is prepared by thoroughly washing with hot water, freshly expressed castor oil, and incorporating sufficient saccharin to give it a sweet taste; it is then flavored by adding small quantities of oil of cinnamon and extract of vanilla. The preparation is stated to keep very well and to be very agreeable in taste.—Standke, *Rundschau*, 1892, III.

Nitro-jute.—In the manufacture of pyroxylin, cotton was primarily used; later, explosives were prepared by using wood and straw cellulose. Dr. O. Mühlhäuser recently experimented with jute and with good results. Taking 5 parts nitric acid and 10 parts sulphuric acid for one part jute, and keeping the temperature 15° C. during the whole operation, there is principally produced cellulose pentanitrate $C_{12}H_{15}O_5(O.NO_2)_5$. The product is insoluble in water, alco-

hol, ether, benzol; soluble in acetic ether and nitro-benzol; if only moistened with acetic ether there is produced a gelatinous mass; nitro-jute is partially soluble in ether-alcohol, a mixture of two parts ether and one part alcohol dissolving 11.93 per cent.; the residue is only slightly soluble in acetone. The most important difference between pyroxylin and nitro-jute is found in the action of alkalis and alkaline carbonates, nitro-jute being readily denitrated; to deprive the product of the acid retained after washing, a dilute (one per cent. or less) and cold solution of sodium carbonate gives the best results.—*Chemiker Ztg.*, 1892, 163.

Impurities of chloroform.—In the fractional distillation of a large quantity of chloroform (made by use of bleaching powder) it was possible to separate a small fraction boiling between 57 and 59° C., and having a specific gravity of 1.185; this is believed to consist of ethylidene-chloride along with some chloroform. Other impurities of the chloroform give rise to a blue or violet coloring matter upon agitation with sulphuric acid; also a principle developing a peppermint-like odor. It is possible by prolonged treatment with sulphuric acid to remove all of these impurities and obtain a chloroform which in no way is inferior to the chloroform of Pictet. An important matter is to decide between such pure chloroform and others of less purity; the results so far obtained warrant the following stringent sulphuric acid test: Equal volumes of chloroform and sulphuric acid (protected from light), agitated frequently during six to eight days should show no change in color; after the chloroform has evaporated spontaneously from the separated sulphuric acid layer, the acid diluted with five parts of water should not show any change upon the addition of 1 cc. $\frac{n}{10}$ silver nitrate solution. This test, it is needless to state, will only be complied with by a very pure chloroform. Another test which promises to be useful: 0.2 gm. metallic sodium and 5 cc. chloroform placed in a glass-stoppered cylinder, and warmed and agitated frequently during two or three days will give the following results; with a pure alcohol-free chloroform there is no change to be noted excepting that sodium chloride separates out in small white crystals. The presence of alcohol or other impurities causes a more energetic reaction and the salt separates with a yellow or brown color; a number of samples of chloroform which answered the requirements of the German Pharmacopœia yielded besides the colored separation of the salt, an

odor of carbylamine indicating contamination with some nitrogenous substance (to which may be ascribed the formation of the blue coloring matter upon treatment with sulphuric acid).—M. C. Traub, *Schwz. Wochensch. f. Chem. u. Pharm.*, 1892, 11.

OLEORESINS.

BY GEORGE M. BERINGER, PH.G.*

Read before the Philadelphia College of Pharmacy at the Pharmaceutical Meeting, Feb. 16.

Since the introduction of oleoresins, a number of pharmacists have essayed their preparation, seeking the use of some solvent less expensive or less dangerous to handle than ether. Benzin appears to have been the solvent suggested to most investigators. Prof. Wm. Procter (*American Journal of Pharmacy*, 1866, page 213) first recorded experiments with this solvent, and stated that in extracting cubebs he obtained 16.5 per cent. of extractive with benzin, against 21.9 per cent. using ether. As benzin dissolved cubebin but slightly, he did not consider it advisable to employ that solvent in the preparation of the oleoresin.

Prof. Procter early recognized the fact that the first portion of the percolate contained nearly the whole of the valuable constituents of the drug, and recommended the propriety of stopping the percolation before complete extraction and sacrificing the little oleoresin left in the dregs. Mr. H. N. Rittenhouse (*American Journal of Pharmacy*, 1867, 27), from experiments confirmed this observation of Prof. Procter, and recommended that the percolation with ether be stopped short of exhaustion, and that the last portions of the expensive menstruum should be forced out with benzin. As a result of these experiments, the U. S. Pharmacopœia of 1870 directed that the oleoresins of capsicum, cubebs, male-fern, lupulin and black pepper, be prepared by percolating 12 troy ounces of the powdered drug with *ether* until 24 fluidounces of percolate were obtained, the bulk of the ether to be recovered by distillation and the remaining portion to be evaporated on the water-bath. The oleoresin of ginger was, however, directed to be prepared by percolating 12 troy ounces of ginger, first with 12 fluidounces of *stronger ether*, and then continuing the percolation with alcohol until 12 fluidounces have been collected. The Pharmacopœia of 1880 ordered all of the officinal oleoresins to be prepared by percolating with *stronger*

ether until for every 100 parts of powdered drug used, 150 parts of percolate are obtained.

In 1872, Prof. J. M. Maisch (American Journal of Pharmacy, 1872, 208), published a review of the experiments of A. H. Bolton and Milton W. Roth. The former of these extracted capsicum, ginger and cubebs with benzin, and regarded the products as representing the drugs in question. The latter reported experiments with ginger and cubebs, from which it appeared that these powders, after extraction with benzin, yielded to ether some non-volatile matters. The benzin oleoresins were soluble in ether, but the ethereal yielded precipitate with benzin. These experiments proved, at least regarding cubebs, the deduction of Prof. Procter in 1866.

Prof. Henry Trimble, in a report to the Pennsylvania Pharmaceutical Association (see Proceedings of that Association, 1888) on commercial oleoresins, detailed a series of experiments on the use of benzin for this purpose. He concluded that while it was preferable to concentrated ether for the extraction of capsicum it would not answer for the other officinal oleoresins. The truth is most likely, *that as a result of more thorough investigations it will be found advisable to adopt different menstrua for the different drugs.*

The writer was led some two years or more ago, to experiment with benzin for this purpose, and came to the conclusion that its use was not admissible in the officinal oleoresins, with, possibly, the single exception of capsicum, pointed out by Prof. Trimble, and then only under certain restrictions which will be mentioned under that title.

About the same time it occurred to the writer that a substitute for ether might be found in acetone. The first experiments were tried with acetone procured from the distillers of wood products. Although guaranteed to be 85 per cent. acetone, it was found to consist largely of methyl alcohol, and even higher boiling fractions, and was found to be entirely unsuited for the purpose. Attempts to purify it by fractional distillation proved so unsatisfactory that its use was abandoned. Subsequently, I was enabled to procure some acetone as made by the manufacturers of chloroform by roasting acetate of calcium or barium, and the object of the present paper is to record some of the experiments tried therewith, to decide to what extent it might replace ether in the manufacture of oleoresins.

Acetone, as procured from this source, is a colorless liquid, having

a not unpleasant odor, and sp. gr. 0.800 to .802 at 15°C. On evaporation it leaves no residue and distils over almost entirely between 55° and 60°C., and is nearly absolutely pure acetone. It is miscible with alcohol, ether and water, and can be easily distilled on the water-bath, boiling evenly and without that bumping that is usually so noticeable in wood products. It can be procured at a cost of 20 to 30 cts. a pound less than concentrated ether, and the loss in handling and distilling is considerably less than with the latter. As it possesses remarkable solvent power, being an excellent solvent for many of the alkaloids and neutral principles as well as for oils and resins, I predict that in the future it will be found a useful solvent in pharmacy and chemistry.

It was found that as with ether the first portion of the percolate contained nearly all the medicinal ingredients of the drug, so that it is unnecessary to continue the percolation after 2 cc. of percolate are obtained for each gramme of ground drug used. While in the experiments of the writer the percolation was continued until the drug was exhausted, in practice he would not advise the continuation of percolation further than that indicated, as the increased yield does not compensate for the loss of menstruum incurred.

In every instance the powders were dried after extraction with acetone, and these re-percolated with concentrated ether, but with the possible exception of capsicum (which I believe, it is impossible to entirely exhaust, even with ether), nothing of value was yielded to that solvent. The resulting oleoresins were generally of excellent quality and the yield and characters were nearly the same as those obtained by the use of ether. The acetone as recovered by distillation from the percolates is contaminated somewhat by the odor of the drug, and is considerably weakened by the absorption of the moisture of the drug. It should be fractionated over fresh lime and is then suited for subsequent operations.

Oleoresina Aspidii.—The writer experienced considerable difficulty in obtaining male-fern fresh enough to use for this purpose, and was unable to collect any of our indigenous *Aspidium marginale*, Swartz. That used for the experiment was the imported rhizome of *Aspidium Filix-mas*, Swartz, and although the best that could be procured it was not as fresh as desired. The brown chaff and the stipes were *entirely* removed and only selected pieces of the peeled rhizome were used, and this will probably account for

the large yield obtained. By thorough exhaustion with acetone it yielded 18 per cent. of oleoresin of a brownish color, which soon deposited a resinous bulky sediment. It yielded a clear solution with ether, alcohol, chloroform and glacial acetic acid. Portions of the same rhizome extracted with concentrated ether by the officinal process yielded 16.18 per cent. of oleoresin. The increased yield with acetone is accounted for by the pectin and red-brown coloring matter which soon deposits. In the final evaporation of the last portions of the acetone on the water-bath, care must be taken not to heat the oleoresin too high or unnecessarily long or a gelatinization may result. A temperature of 70° to 80° C. is as high as there is any necessity to maintain.

Owing to the unsatisfactory quality of the drug experimented with, and the peculiarities of product just mentioned, the advisability of substituting acetone for the ether of the officinal process must be decided by additional experiments. While the writer has no doubt that acetone will thoroughly extract the drug, he hopes that others so situated as to collect the fresh *aspidium* will repeat the experiment.

The green-colored oleoresins of male-fern in the market are largely imported from Germany, where it is doubtless prepared from the green drug. It all deposits after keeping for a short time a bulky sediment consisting of resin and filicic acid. As this latter is now considered medicinally as valuable as the more fluid portion of the oleoresin, the Pharmacopœia adds a note directing that this be thoroughly mixed with the fluid portion before dispensing. Frequently, this is simply impossible, as it adheres firmly to the container and is the source of annoyance to the dispenser. It is the custom of most pharmacists to add sufficient ether to permit this admixture. Instead of this I would suggest the addition of a few drops of aqua ammoniæ, which will readily liquefy the sediment and furnish a uniform preparation, and is believed not to affect the medicinal value. The samples shown have been thus prepared and now furnish solutions with ether, alcohol and chloroform, which are not entirely clear.

Oleoresina Capsici—The yield of oleoresin from capsicum is stated in the accepted text-books as being 4 to 5 per cent. This statement most likely refers only to the more fluid portion, the fatty matters presuming to be separated, as directed by the Pharma-

copœia. This presumption is rarely, in practice, carried out. The manufacturers seeking a large yield obtain, by more thorough extraction with ether, 20 to 22 per cent. and separate but little of the fat. A sample of capsicum extracted with ether, by the U. S. P. process, yielded 17.32 per cent.; with acetone by percolating only until 2 cc. of percolate was obtained for every gramme of drug used, it yielded 18.00 per cent., and with purified benzin under similar conditions 21 per cent. By continuing the percolation until extraction was complete, the yield, with acetone and benzin, was increased to 25 per cent., but the resulting oleoresin was almost a solid, as the continued extraction seemed to largely increase the percentage of palmitin extracted. These oleoresins made with ether and acetone were both entirely soluble in benzin, it being the only oleoresin made with acetone, which was soluble in this solvent. They yielded, with alcohol, solutions which were not entirely clear. From these experiments it was concluded that either acetone, ether or benzin will extract capsicum, but the percolation should not be continued beyond obtaining 1.5 cc. of percolate for each gramme of the drug.

The slight solubility of palmitin in alcohol suggested that this oleoresin might also be prepared by the use of alcohol. Fifty grammes of the capsicum was percolated with alcohol and yielded 28 per cent. of extract. From this there separated a resinous and waxy sediment almost insoluble in ether. The liquid portion was extracted by mixing with an equal volume of ether, in which it was easily soluble and separated from the sediment by filtering through absorbent cotton. This yielded an oleoresin more liquid than those made with the other solvents and exceedingly hot, corresponding to nearly 14 per cent. of the drug.

Oleoresina Cubebæ.—Powdered cubebs thoroughly extracted with acetone yielded 25 per cent. of oleoresin. This was of excellent quality, fully representing the drug, and was not entirely soluble in benzin, but yielded clear solutions, and was readily soluble in ether, chloroform, alcohol and glacial acetic acid. After a time, it deposited some cubebin, the wax, however, separated out at once, being left in the still. Working on a larger scale since, the yield from two lots of cubebs have been 24.1 per cent. and 21.75 per cent., respectively, which agree with yields generally obtained by the use of ether.

Oleoresina Lupulini.—The yield of oleoresin from lupulin is variously stated as being from 50 to 70 per cent., and must neces-

sarily vary considerably. With selected lupulin, using concentrated ether, I have obtained 70·8 per cent. With acetone, by pushing the extraction to completion, I obtained 71 per cent. This latter of fine quality was but slightly soluble in benzin, but freely in ether, alcohol, chloroform and glacial acetic acid.

Oleoresina Piperis.—Ground black pepper yielded to acetone 9·97 per cent. The piperin soon separated and was removed by straining. The oleoresin obtained amounted to 5·93 per cent., and was similar to that obtained by the use of ether. It was but partly soluble in benzin, but entirely in alcohol, ether, chloroform and glacial acetic acid. By the use of ether, and working on a manufacturing scale, I have obtained a yield of from 5 to 6·7 per cent., but see no reason why acetone should not be substituted for ether in this preparation.

Oleoresina Zingiberis.—Powdered Jamaica ginger extracted with acetone yielded 5·57 per cent. of oleoresin of a fine quality, unsurpassed in aroma by that made with ether. The resinous portion was insoluble in benzin, but the oleoresin was entirely soluble in ether, alcohol, chloroform and glacial acetic acid. It appeared to be identical with that made with ether, and I would strongly recommend the use of acetone in this preparation.

Oleoresina Apii and *Apiol*.—An examination of some commercial samples of apiol as recently made showed them to be largely oleoresins of parsley seed, varying in color from brown to a bright green, and exhibiting great difference in their density and action with solvents. None of them complied with the requirements of an apiol prepared, as originally proposed, by Joret and Homolle (American Journal of Pharmacy, 1863, 84), nor according to the process of L. Wolff (Ibid. 1877, 1). Freshly powdered parsley seed yielded to acetone 24 per cent. of oleoresin from which 3 per cent. of wax soon separated leaving, after straining, 21 per cent. of a bright green liquid oleoresin. This was entirely soluble in ether and chloroform, but about 10 per cent. of it of a resinous character was insoluble in benzin.

Purified benzin extracted 22·3 per cent. of oleo-resin entirely soluble in ether, chloroform and acetone. Both of these oleoresins compared favorably with most of the so-called "*apiols*" of the market, and for this purpose benzin appears to answer as well as ether or acetone. Upon treating these oleoresins with alcohol and subsequently evaporating this solvent, as suggested by L. Wolff (loc. cit.), about 4 per cent. of the weight of the seed was yielded.

INFANTS' FOOD.¹

BY DR. BLACKADER.

Practically, all unite in regarding cow's milk, or some preparation of it, as the only serviceable substitute for human milk. There are certain difficulties in its preparation which must be clearly understood to be overcome.

(1) Cow's milk contains about double the amount of albuminoids that human milk does, while human milk contains a slightly larger amount of fats and sugars. Human milk is always alkaline, cow's milk usually acid.

(2) Cow's milk always contains microbes; frequently they are of the varieties which produce poisonous products.

(3) The supply of cow's milk being unlimited, we have not the same check upon the amount that we have when the infant is on the breast, hence we are apt to have added to the other difficulties that of over-feeding.

Either of these difficulties alone might defeat an attempt to nourish an infant with cow's milk; while operating together they render the problem in many cases very difficult. The author had hoped that with increasing knowledge of the composition of the two milks, and of the proper amount to be administered, together with sterilization, the problem of artificial feeding had been solved. While many cases yielded gratifying results, hopes in others were disappointed. Changes which milk undergoes in the sterilizing process may be epitomized as follows:

I. The starch liquefying ferment which exists in cow's milk in minute quantities is destroyed when the heat rises above 165° F.

II. A portion of the lactalbumen is coagulated.

III. The casein, after the action of prolonged heat, is less readily coagulated by rennet, and yields slowly and imperfectly to the action of pepsin and pancreatin.

IV. The fat globules are injuriously affected by the heat. The fat is free to some extent, and after standing, small lumps of butter are sometimes observed on the surface of the milk, while the portion not freed has a decidedly lessened tendency to coalesce. When sterilized and unsterilized milk are churned, it is found that the unsterilized yields more butter and in less time.

¹ *Montreal Medical Journal*; Archives of Pediatrics, Jan., 1892, p. 67.

V. Milk sugar, by long-continued heating, is completely destroyed.

It would appear, therefore, that sterilized milk is less readily and less perfectly digestible than raw milk. Yet, it is to be preferred to raw milk swarming with bacteria. Under its use in the large cities the percentage of infant lives saved is increased and the percentage of summer diarrhœa is decreased. In the country or where fresh milk can be procured, the process of sterilizing is if possible to be avoided. The chief difficulty lies in securing the proper amount of heat. For ordinary purposes a temperature of 155° F. is sufficient, and the milk is not materially changed at that temperature.

In some instances the author believes that condensed milk may be substituted for a short time. It has the disadvantage of being deficient in fats—the cream being to a great extent removed by the process of condensing, to avoid rancidity in the prepared article.

Of the cereals used for infant food, barley, wheat and oatmeal are the most commonly employed. Of these, the author prefers barley. An excellent preparation is barley flour submitted to the action of heat of 212° F. for five or six days. It may be advantageously added to the milk for younger children, and in older children may form a fair proportion of the food.

A BACTERIUM WHICH FERMENTS STARCH AND PRODUCES AMYL ALCOHOL.¹

By L. PERDRIX.

The author has separated from Paris water a bacillus, *B. amyl-ozymicus*, which ferments starch, with production of amyl alcohol. It is separated by cultivation on potatoes, and finally on gelatin. The bacillus is 2–3 μ long, and 0.5 μ thick; the rods are joined in pairs and chains, and in the absence of oxygen are motile, like *Vibrio butyricus*, Pasteur. The rods are readily stained; the spores are set free through the dissolution of the walls of the mother cell. The bacillus flourishes only in the absence of oxygen, readily, however, either in a vacuum or in hydrogen, nitrogen, or carbonic anhydride. The optimum temperature is 35°; it grows quite well at

¹*Chem. Centr.*, 1891, ii, 252; from *Ann. Inst. Pasteur*, 1891, No. 5; reprinted from *Jour. Chem. Soc.*, 1892, p. 90.

20–25°; at 16–17°, fermentation commences at the end of our days. Its “maximum” temperature is 42–43°. It will grow in all the usual cultivating media, ferments the sugars and starch, but does not attack cellulose or calcium lactate, differing in this respect from *Vibrio butyricus*, Pasteur. Acids are produced during the fermentations which it causes, and the presence of acidity, equivalent to 0.055 gram sulphuric anhydride, or of alkali equivalent to 0.08–0.11 gram in 100 cc., is sufficient to arrest the process; the addition of calcium carbonate to the liquid enables the fermentation to become perfect. Glucose ferments to hydrogen, carbonic anhydride, acetic and butyric acids during the first three days; from the third to the ninth day no acetic acid is formed. From saccharose and lactose, acetic acid is formed during the first five days. The greater the amount of oxygen present, the more acetic acid is produced; it was also observed that at the time of the butyric acid formation, all the cells contained spores. From the fermentation of starch a distillate was obtained, of which one-third was amyl alcohol, and from 100 grams of potatoes, 2.3–2.5 cc. of alcohols were separated. The sugar obtained from starch is very similar to glucose, but has a less rotatory action, and its phenylglucosazone melts 10° lower than that from glucose; 94 per cent. of the starch is converted into sugar, carbonic anhydride, ethyl and amyl alcohols, acetic and butyric acids, and 6 per cent. is converted into dextrin. The sugar formed by the bacillus from starch may be fermented perfectly with beer-yeast, either after sterilization, or in the presence of the bacillus. If either the sugar obtained by fermentation of starch with this bacillus, or a sterilized mash, be fermented with a pure cultivation of yeast, no fusel oil is formed, and the author concludes that the fusel oil found in commercially prepared alcohol, is formed by the action of bacteria. The *B. amylozymicus* remains uninjured for 10 days at 50–55°.

THE ANALYSIS OF PEPTONES.¹

By C. W. HEATON AND S. A. VASEY (Charing Cross Hospital).

It is well known that in the digestion of meat by acid pepsin several compounds are obtained, which, although similar in composition, are by no means identical in chemical properties or nutritive

¹ Read before the Society of Public Analysts; reprinted from the Analyst, 1892, p. 28–34.

value. Our knowledge of these compounds has of late been considerably extended, and various methods for their quantitative estimation have been devised. We have no new reagent to suggest; but after careful trial of all the processes at present in use, we have found that by a combination of several of them the analysis may be simplified.

The substances to be determined may, for analytical purposes, be classified as follows:

- (1) Water; ash; total nitrogen.
- (2) Matters extracted by absolute alcohol. Definite compounds for the most part; some nitrogenous, some non-nitrogenous. It has been shown by M. Denaeyer (*v. infra*) that one variety of gelatin present in peptones is soluble in alcohol.
- (3) Albumins:—coagulated and rendered permanently insoluble by heat or by strong alcohol.
- (4) Albumoses:—not coagulated by heat. Soluble in water. Precipitated by alcohol, cupric hydrate, phospho-tungstic acid, mercuric chloride and ammonium sulphate.
- (5) Peptones:—not coagulated by heat. Soluble in water. Precipitated by alcohol, phospho-tungstic acid and mercuric chloride, but not by cupric hydrate or ammonium sulphate.
- (6) Gelatins:—partly soluble in alcohol. Precipitated entirely and in all forms by phospho-tungstic acid and ammonium sulphate. Not precipitated by cupric hydrate or mercuric chloride.

It is well known that the nitrogen in proteids varies from 14.4 per cent. in chondrin to over 18 per cent. in gelatin. (*Beilstein*, iii, 1292-4.) Following previous workers, we have assumed 15.8 per cent. of nitrogen, which gives as the factor to be applied to the nitrogen 6.33. More exact knowledge is required before separate factors for each of the nitrogen determinations can safely be adopted.

The following is an abstract of the analytical methods described in recent researches from which our modified process has been derived:—

- (1) A. Stutzer. (*Ber.* **13**, 251. *Ch. Soc. Absts.*, 1880, 676. *Cent. f. allg. Gesund. Pflege*, 1882, 179. *Ch. Soc. Absts.* 1882, 1239. ANALYST x. 57.) Meat preparations are digested with pepsin in the usual manner. In the undissolved residue nitrogen is determined by soda-lime. The fluid is then agitated with cupric hydrate,

suspended in weak glycerin, which, if the fluid be not too acid, throws down albumose. The separation appears to be complete, and the liquid filters well. In the cupric precipitate nitrogen is determined by soda-lime. The cupric mixture can be prepared as follows:—

100 grams of crystallized cupric sulphate are dissolved in 5 litres of water and 2.5 grams of glycerin added. The solution is then made alkaline with caustic soda, and filtered. The precipitate is well mixed with a large excess of water containing 5 grams of glycerin per litre. All traces of alkali are now completely removed by decantation, and, if necessary, by filtration, the same glycerin solution being used throughout. The precipitate is then made up to 1 litre with water containing 10 per cent. of glycerin. The thin emulsion then contains nearly 40 grammes per litre of cupric hydrate, and can easily be transferred by a pipette. It may conveniently be described as Stutzer's reagent.

(2) Kühne and Chittenden. (*Zeit. Biol.*, xxii, 409, 423. Amer. Jour. Phar. 1886, p. 568.) The substance previously known as peptone was found to contain bodies of two kinds, one of which (albumose) can be precipitated and washed by a saturated solution of ammonium sulphate, while the other (peptone) remains in solution. The filtrate is concentrated until crystals of ammonium sulphate separate and the remaining sulphate is then removed by barium carbonate and hydrate, the excess of barium being carefully precipitated by sulphuric acid. Methods for the estimation of albumose and peptone are described. They involve the use of phospho-tungstic acid.

The paper contains much valuable matter in regard to the nature, composition and reactions of peptones.

(3) König and Kisch. (*Zeit. Analy. Chem.*, xxviii, 191. Amer. Jour. Phar., 1889, 525). The peptonic fluid is boiled and filtered. In the residue nitrogen is determined by the Kjeldahl process, and this multiplied by 6.25 gives albumen.

The filtrate is divided into two portions. In one, albumose only—as it was then thought—is thrown down and washed by ammonium sulphate, as in the method of Kühne and Chittenden, but the precipitate is treated differently.

It is weighed, and the ammonium sulphate in it is afterwards estimated volumetrically by barium chloride and deducted, the

difference being taken as albumose. In the second portion both albumose and peptone are precipitated by phospho-tungstic acid. In the precipitate, nitrogen is estimated by the Kjeldahl process. Multiplying the nitrogen by 6.25, albumose and peptone are found, and so, of course, peptone by difference.

(4) A. Denaeyer. (*Bull. de l'Assoc. Belge des Chimistes*, March, 1890. ANALYST, June, 1890.) In this memoir it was shown that gelatin had been confounded with albumose in previous researches. Gelatin in all forms is precipitated by ammonium sulphate, so that the albumose found by the methods of Kühne and Chittenden, and König and Kisch was really a mixture of albumose and gelatin. If albumin and albumose are previously separated, gelatin may be precipitated completely by ammonium sulphate. It is unnecessary to describe the analytical method founded on this important discovery, as it has been improved in a subsequent paper by the same author.

(5) A. Denaeyer. (*Bull. de l'Assoc. Belge de Chimistes*, December, 1890. ANALYST, May, 1891; see also Am. Jour. Pharm., 1891, p. 146.) This memoir, recently translated and published with an addendum by Straker and Sons, London, contains later results of M. Denaeyer's work. The analytical method which is described—although it is based upon those which preceded it—shows a distinct advance. Our own process is but a modification, and, we think, an improvement upon it. M. Denaeyer's system may be summarized as follows:—

(a) The peptonic fluid is treated with strong alcohol. After standing for 24 hours the precipitate, which consists of albumin, albumose, coagulable gelatin and peptone, is washed with alcohol, dried and weighed. The solution is then divided into two portions, which are separately treated (*b* and *c*).

(*b*) One portion of the alcoholic solution is evaporated to dryness and extracted with warm water. Excess of saturated solution of ammonium sulphate is then added, and the mixture warmed. On cooling, the gelatin soluble in alcohol adheres to the basin, and may be washed slightly with ice-cold water, dried and weighed. It is then re-dissolved in warm water, and the ammonium sulphate in it estimated by barium chloride and deducted from the weighed gelatin.

(*c*) The second portion of the alcoholic solution is evaporated to

dryness, dried over phosphoric anhydride for 8 hours and weighed. This operation is difficult as the residue is very hygroscopic, and M. Denaeyer prefers to estimate the extractives approximately by difference.

The alcoholic precipitate is treated with warm water and filtered from albumin, which can be weighed in a tared filter. The solution is then divided into three portions.

(d) Of these, one is treated with excess of solution of phosphotungstic acid.

This throws down albumose, gelatin and peptone. The precipitate is thrown on a tared Schleicher's filter, washed with dilute hydrochloric acid, dried and weighed. It is then burnt, and the proteids found by difference.

(e) Another portion of the aqueous solution of the alcoholic precipitate is treated with ammonium sulphate as in process (b).

The weight of the precipitate, after deducting the sulphate, gives albumose and gelatin.

(f) The third portion is accurately neutralized and treated with excess of saturated solution of mercuric chloride. This throws down albumose and peptone, but not gelatin. The precipitate is rejected. The filtrate is treated as before with ammonium sulphate, and the weight of gelatin insoluble in alcohol determined.¹

True peptone is now, of course, found by difference.

This scheme for the analysis of peptones is certainly the best that has hitherto been devised, but it is liable to objection in one or two respects. The process which we have adopted, and in which that of Stutzer is incorporated, appears to us simpler and more satisfactory.

(6) A. Denaeyer. (*Jour. Pharm. Anvers*, November, 1891. ANALYST, December, 1891.)² This is an admirable process for a simple assay of genuine commercial peptones. 10 cc. of aqueous peptone, containing about 2 grams of dry matter, are treated with 100 cc. of strong alcohol. After standing for 24 hours the precipitate is washed with alcohol, dried and weighed. The alcoholic solution is also dried at 105° C. and weighed. M. Denaeyer

¹ In a subsequent note M. Denaeyer recommends the removal of excess of mercury by H₂S, and points out that the phospho-tungstic treatment may be avoided.

² Our paper was written before this note appeared.

holds that in a well-prepared peptone the alcohol extractive should not exceed 30 per cent., but we are inclined to think this too low an estimate. A large proportion indicates that leucine, tyrosine, and other products of metamorphosis are present. It is evident that this process is not intended to replace more exact methods of analysis. Its greatest defect is that, if gelatin had been added to the peptone, it would be precipitated by alcohol, and would, therefore, be weighed with the nutritive constituents.

THE MODIFIED PROCESS.

It is convenient to work with a tolerably concentrated solution. Any portion insoluble in warm, but not boiling water, may be removed by filtration, and treated separately for nitrogen, etc. If a jelly be under examination it must be liquefied by heat or by dilution. In the following synopsis a strength of about 20 per cent. of solid matter is assumed. It is obvious that in any such scheme of analysis the mineral salts must be included among the organic proximate constituents, for our knowledge does not yet permit us to assign to albumose, peptone, and the like, any definite proportion of mineral compounds. It is best to make separate estimations of water, ash and total nitrogen.

(1) *Water; ash; total nitrogen.*—Estimated as usual. About 3 grams for water and ash and about 1 gram for total nitrogen, by the Kjeldahl method, are convenient quantities.

(2) *Albumin; gelatin insoluble in alcohol (coagulable gelatin); albumose; peptone.*—40 grams of fluid peptone containing about 80 per cent. of water are dropped gradually into 300 cc. of nearly anhydrous alcohol, in a large weighed beaker and the mixture agitated by gentle centrifugal motion. After an hour or so the above-named compounds will have separated and can be washed with absolute alcohol by decantation. The alcoholic solution is preserved for further treatment and is hereafter alluded to as the *stock alcoholic solution*. The beaker, with its contents, is then dried to constant weight at 100° C.

(a) *Albumin.*—The weighed alcoholic precipitate is digested with warm water and washed on a tared filter. The residue, which has been rendered insoluble by the alcohol, is weighed as albumin.

The filtrate from albumin is diluted with water to 250 cc. This may be described as the *stock aqueous solution*.

(b) *Albumose and gelatin*.—25 cc. of stock aqueous solution are evaporated to a few cc., treated with saturated solution of ammonium sulphate, raised to nearly 100° and quickly cooled with centrifugal agitation. The ppt. is thrown on a tared filter, washed with ammonium sulphate, dried and weighed. In the ppt. the excess of ammonium sulphate is afterwards estimated gravimetrically by barium chloride and deducted.

(c) *Albumose*.—50 cc. of stock aqueous solution are raised to near 100° C. and are then treated with 30 cc. of Stutzer's reagent. The ppt. is washed in a filter with hot water, and the nitrogen contained in it estimated by the Kjeldahl method. 30 cc. H_2SO_4 and a globule of mercury give good results.

(d) *Gelatin*.—It is evident that from the results of the two last operations both gelatin and peptone may be found by difference, and our experiments convince us that a satisfactory assay may be obtained in this way. But a direct estimation of gelatin may be made as follows: The filtrate from the copper ppt. is concentrated to a few cc. in a beaker previously weighed with a glass rod; saturated solution of ammonium sulphate is then added, the mixture raised nearly to the boiling point, and then quickly cooled with centrifugal agitation. As M. Denaeyer has shown, the gelatin now separates and adheres to the sides and bottom of the beaker, particularly if touched from time to time with the rod. The gelatin may now be once washed rapidly with the ice-cold water, dried and weighed, and the ammonium sulphate retained in it estimated and deducted as before.

(3) With regard to the alcoholic extract which we have described as the stock alcoholic solution, we confirm M. Denaeyer's statement that the dried extract is too hygroscopic to permit any accurate inference to be drawn from its weight. It is better to adopt the following method, which is in substantial agreement with that recommended by M. Denaeyer. The stock alcoholic solution is made up to a definite volume, say to 500 cc. This is divided into fractions for separate treatment.

(a) *Gelatin soluble in alcohol*.—One fraction, say one-fifth, is evaporated to dryness, taken up with warm water and treated with ammonium sulphate in the manner already described.

(b) *Urea, etc.*.—Another fraction, one-tenth, may be evaporated to dryness and treated with sodium hypobromite. But evidently

the nitrogen could not with any accuracy be calculated as urea.

(c) *Nitrogen*.—Another fraction, one-fifth, may be evaporated and treated by the Kjeldahl method for nitrogen. After deducting the nitrogen present as soluble gelatin, the residue multiplied by 3.12 gives the creatin-equivalent of crystallizable nitrogenous compounds.

(d) *Ash in alcohol extractive*.—Another fraction may be used for the determination of ash.

The following analysis of a sample of beef-peptone prepared by M. Denaeyer will serve to illustrate the system.

The peptone was a semi-solid jelly, liquefied by gentle heat. It was sterile and bright, and was free from bitterness. It tasted like beef-tea, and mixed easily with water.

I.

Organic matters,	15.59
Mineral matters,	2.43
Water,	81.98
	<hr/>
	100.00

II.

Albumins coagulated by heat and alcohol, 0.12

Matters precipitated by alcohol:—

Gelatin (direct weighing), 2.00

Albumose (Am. sulphate ppt. *minus* gelatin), . . . 5.06

[N.B.] Albumose found by estimation of N. in Cu. ppt., $.79 \times 6.33 = 5.00$.

Peptone (difference), 3.33

Total (direct weighing), 10.39

Matters not precipitated by alcohol:

Gelatin soluble in alcohol (direct weighing), 1.30

Extractive, etc. (difference), 6.21

Total, 7.51

Water, 81.98

100.00

III.

Nitrogen (Kjeldahl):

Total, 2.67

In alcoholic ppt., 1.38

In albumose,79

Liberated by NaBrO,22

A READY METHOD OF DISTINGUISHING BETWEEN ALPHA- AND BETA-NAPHTHOL.

By F. W. RICHARDSON, F.C.S., etc.

Having occasion to test the contents of two bottles to ascertain which was alpha- and which beta-naphthol, I applied the methods of N. Yvon, described in the *Chemical News* (vol. lxiv., p. 321), but obtained very unsatisfactory results; indeed process (2), as might be expected, gave no result whatever.

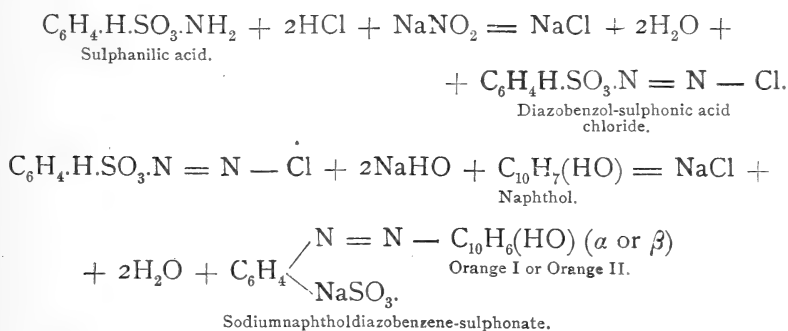
Remembering that the difference between the azo-dyes "Orange I" and "Orange II" is entirely due to the fact that while for the preparation of the former dye α -naphthol is used, β -naphthol is required for the latter, I worked out the following process:

Dissolve about 5 cgm. of sulphanilic acid in a little water containing about 5 cc. of normal soda; add 5 cc. of normal sulphuric acid, and mix the solution with 2 cgm. of sodium nitrite dissolved in a few drops of water.

Dissolve a little (about 4 cgm.) of the naphthol by the aid of a few drops (0.5 cc.) of normal soda, and into this solution pour the diazotized sulphanilic acid. With α -naphthol the liquid becomes dark blood-red; with β -naphthol only a reddish-yellow color is produced; this difference is most marked when the dyes are salted out.

The α -naphthol dye becomes dark brown with dilute sulphuric acid, while the β -naphthol compound is quite unchanged: this last reaction is very distinctive.

The equations representing the changes which take place are as follows:



THE VALUE OF THE UNOFFICIAL PARTS OF
IPECACUANHA.

BY DAVID HOOPER, Government Quinologist.

About two years ago Prof. Flückiger, of Strassburg, informed me in a letter that he had ascertained that the seeds of *Ipecacuanha* were devoid of alkaloid. He also suggested that the leaves, if procurable, should be examined for alkaloid. At that time the only materials available for such an investigation were some very young plants growing in the Teak plantation at Nilambur in the Malabar district, and the leaves were being used for propagating purposes, as it was shown by Lindsay some years ago that a leaf in suitable soil is capable of producing roots and buds. The *Ipecacuanha* plants at Nilambur are making satisfactory progress considering the slowness of their growth. They have a good soil of sandy loam with organic matter, and they have sufficient moisture and shade; the root growth is more vigorous than that of the stem, and thousands of plants will soon be ready for supplying the root to the local Medical Store department.

Last month I was able to obtain six plants of two and a half years of age for examination. The roots were plump and dark colored, the annulations were well-formed, and the length of the longer roots was eight inches. The stems were woody and wiry, decumbent, as long as the roots, grayish in color, knotted and marked with leaf scars on the upper part, very slightly branched, quadrangular and smooth. The leaves were few and rather crowded at the upper part of the stem, opposite, shortly stalked, stipules large, united at the base, where are several ovoid glands, persistent, adpressed to the stem, whitish (pink on young plants), about as long as the petiole, deeply cut into four subulate laciniaë, blade 2-4 inches long or more, oval, pointed at the apex, entire, wavy on the margin, thick, with a few hairs on the edge, dark green, glossy, and nearly smooth above; paler, somewhat pubescent and with prominent veins beneath.¹

The description of the plants from Nilambur agrees with the description of the cultivated variety of *Cephaëlis Ipecacuanha*,

¹ The description of the leaves is after that in "Medicinal Plants." The figures of the leaves and root in that work are rather imperfect.

defined by the late Professor Balfour ("Pharmacographia," 2d ed., p. 370). The six plants when dried in the sun afforded:

	Grams.
Root	21
Stem	8
Leaves	4.8

These were reduced to fine powder, and a sample of each was examined separately, according to the same process. The powder was exhausted with warm alcohol, the percolate evaporated to dryness on a water bath, water added to the dried extract and acidulated with diluted sulphuric acid. After filtering and washing with water, the clear liquid was treated with some freshly prepared Mayer's solution, 1 cc. of which corresponds with 0.0189 gram of emetine, until a precipitate ceased to be formed. The results of this analysis were as follows:

Root contained	1.79	per cent. of alkaloid.
Stems	1.13	" " "
Leaves	1.45	" " "

The alkaloid was examined qualitatively; that separated from the stems and leaves had the same appearance and characters as that from the root, and it was doubtless emetine. Herbaceous plants containing an alkaloid, almost invariably yield the same alkaloid in different parts of the plant, but in trees and shrubs different alkaloids often occupy different portions of the same plant. It is of interest to know that the leaves and stems of the true *ipeacuanha* contain a good proportion of emetine, but they are not likely to displace the root from its position in the *Pharmacopœias* and in commerce.—Phar. Jour. and Trans., Jan. 23, 1892, p. 591.

ALKALOID FROM CHRYSANTHEMUM FLOWERS.¹

BY F. MARINO ZUCO.

The author has previously extracted from *chrysanthemum* flowers a new cholesterol, a glucoside, and an alkaloid. (See Amer. Jour. Phar., 1890, p. 579). The latter is prepared in quantity by boiling about 10 kilos. of the flowers in distilled water (3 parts) for two or three hours, filtering through cloth, pressing the residue and treating it again in the same manner. The extracts are evaporated

¹ *Gazzetta* 21, 516—554. Jour. Chem. Soc., 1892, p. 84.

down to 30 litres, treated with neutral lead acetate and basic acetate of lead, neutralized with soda, filtered, and the excess of lead removed by passing sulphuretted hydrogen. After filtration, the liquid is concentrated to about 2 litres, boiled for some time with dilute sulphuric acid, filtered, and again boiled until no more resinous matters are formed. The liquid is then decolorized with animal black and an excess of the double iodide of potassium and bismuth added, when a heavy, bright red, crystalline powder containing the whole of the alkaloid is deposited.

The pure alkaloid *chrysanthemine*, $C_{14}H_{28}N_2O_3$, is a colorless syrup which, when kept in a vacuum, partially crystallizes in tufts of silky needles, and may be heated without decomposition to 100° , but not beyond that temperature. It dissolves in water forming alkaline solutions which absorb carbonic anhydride from the air; it is also soluble in ethyl and methyl alcohols, but not in ether, chloroform, or benzene. Salts of chrysanthemine yield, with the double iodide of potassium and bismuth, orange-red, flocculent precipitates which become crystalline and bright red on agitation; with the double iodide of mercury and potassium, a yellowish-white precipitate; with the iodide of platinum and sodium, a brown precipitate; with auric trichloride, a yellow, crystalline precipitate which dissolves on heating and is re-deposited on cooling; no precipitate is formed with platinic chloride, picric acid, tannin, or mercuric chloride. The base is optically inactive and physiologically innocuous. Its salts are for the most part soluble in water and even deliquescent; the aurochloride and the double iodide of bismuth and chrysanthemine are insoluble. It is a bi-acid base, but in dilute solutions it behaves towards acids as if it were mon-acid. Both the *hydrochlorides* crystallize in small, colorless, deliquescent needles, very readily soluble in water and alcohol, but only moderately in hot water. The *aurochloride* and *platinochloride* are very soluble in water.

On heating chrysanthemine with an excess of methyl iodide for two days at 100° , two methyl groups are taken up, and it is partly converted into a new base in which both nitrogen atoms are combined with hydrogen. The two bases can be separated by taking advantage of the great difference in the solubility of their platinochlorides in water. The *platinochloride* of the new base, $C_{16}H_{32}N_2O_3 \cdot H_2PtCl_6$, crystallizes in small, orange-colored needles, dissolves very sparingly in water, but moderately in hot water slightly acidi-

fied with hydrochloric acid; it is insoluble in absolute alcohol. The *hydrochloride* is a deliquescent compound which crystallizes in a vacuum in tufts of small needles. It is freely soluble in water and in hot absolute alcohol. The free base is a syrupy liquid which becomes partially crystalline after being kept for a long time in a vacuum.

Oxychrysanthemine, $C_{14}H_{26}N_2O_4$, prepared by oxidizing chrysanthemine with sodium hypobromite, yields a double iodide with bismuth, crystallizing in orange-colored needles readily soluble in hot water. The alkaloid is a syrupy liquid which, if kept in a vacuum, is slowly converted into a very deliquescent, crystalline mass. It has an acid reaction, but combines with both acids and alkalies. Chrysanthemine strongly resists the action of oxidizing agents; on heating a sulphuric acid solution of the base with potassium dichromate and sulphuric acid, it is almost quantitatively converted into oxychrysanthemine; a solution of potassium permanganate, on the other hand, only partially converts it into oxychrysanthemine, carbonic anhydride, ammonia, and traces of trimethylamine being evolved, whilst a portion of the base is completely broken up. Oxychrysanthemine is completely disintegrated by a hot solution of potassium permanganate. Dilute solutions of alkalies have no action on chrysanthemine even after prolonged boiling: very concentrated solutions decompose it into trimethylamine, γ -hydroxybutyric acid, and hexahydropiperidinecarboxylic acid with evolution of hydrogen. If chrysanthemine is treated with a moderately concentrated solution of potash, the decomposition takes place more slowly and a small quantity of a product intermediate between chrysanthemine and hexahydropyridinecarboxylic acid is obtained. This compound yields an *aurochloride*, $C_{11}H_{21}O_4NaAuCl_3$, crystallizing in tufts of reddish-yellow needles. Oxychrysanthemine is decomposed by very concentrated solutions of potash into hexahydropyridinecarboxylic and succinic acids, carbonic anhydride, trimethylamine and hydrogen. Fuming hydrochloric acid has no action on chrysanthemine even after prolonged heating; concentrated sulphuric acid merely resinifies a very small proportion on boiling.

A glacial acetic acid solution of chrysanthemine (1 mol.) dissolves iodine (10 atoms), and on distilling off the solvent in a vacuum, a brown oil is left which does not lose iodine on heating at 150° . Chrysanthemine may be boiled with water for days with-

out change ; if, however, a solution of the base in an equal weight of water is fractionally distilled, water alone passes over until the temperature exceeds 150° ; trimethylamine then begins to come off, and continues to do so until the temperature reaches 200° , when an oily product accompanies it. If the apparatus is now exhausted, the residue distils over between 200° and 230° , the distillate consisting of a mixture of aqueous solutions of hexahydropyridinecarboxylic acid, amyl glycol, dihydroxyamylpiperidine, trimethylamine and traces of pyridine bases.

ON THE FLORA OF NORTHERN OHIO.

BY EDO CLAASSEN.

It is certainly with an ardent desire that after the long winter peculiar to this part of the United States everybody living there greets the arrival of spring and the reawakening of Nature ; many kinds of work interrupted by frost and rough weather are then recommenced, and in their leisure hours all, with hardly an exception, take their steps into the open air to breathe the delightful exhalation of spring vegetation, and return to their homes and to their work, strengthened and invigorated. Although, without doubt, everyone hails joyfully the opening of the buds and the appearance of leaves and blossoms, there seems to be one only whose heart in such a time beats louder and whose blood runs quicker through his veins ; he thinks of the reappearance of the darlings and favorites which he has annually saluted on his travels over hills, through fields and forests. This one is the botanist ! It is a well-known fact that he will then look at all his acquaintances with a happy face ; but at the same time it surely cannot be denied that his affection does not belong so much to those who in former years have been his daily companions as to those other ones whom he has met now and then only, and of whom we may often say, that they have immigrated from countries far off, from places where there is a soil and a climate in which they always thrive well. Such a region is Northern Ohio, where, on account of the peculiar climate produced by the gigantic quantity of water of Lake Erie as well as by the manifoldness of soil, many plants can be met with which usually are indigenous to more southern parts of the United States or to the shore of the Atlantic Ocean. The slate rocks, the sand- and limestones of the counties east, south and west of Cleveland belong to the Devonian, the Carboniferous and the Silurian Systems ; in olden times, they were gradually covered, especially in the valleys of the rivers and of the creeks as also on and near the lakeshore, by layers of sand and of clay, the products of the decomposition of the above rocks, furnishing often a soil favorable to the growth of peculiar plants. More interesting to the botanist even than these places are the innumerable lakes and ponds, of which some are situated in every neighboring county, surrounded by hills, and thereby entirely shut off from the brooks and rivers which carry the waters of Northern Ohio to Lake Erie. As in their water we find shells peculiar to them, so we meet in them and on their borders plants rarely seen elsewhere. It is therefore not astonishing if the

eager botanist turns his steps not less frequently to those than to the lake region. The railroad, or, if necessary, a steamer, will quickly carry him to all the above places, while the steamer only can be taken into consideration if he intends a visit to the islands in Lake Erie; for instance, to Kelley's or South Bass Island. Keeping these facts in mind, it may readily be seen that in consequence of the difference of soil and of climate (the climate of the islands, and of the lakeshore, and that of the more southern parts near and on the watershed of this State),¹ the flora of our part of Ohio should be manifold, as it is in reality. The flora of the different parts of our region of Ohio to be contemplated here may for an easy survey consequently be divided into (1) the flora of the islands; (2) that of the lakeshore and of the adjacent swamps; (3) that of the lakes and ponds, and (4) that of the hills and valleys, of which the flora of the islands seems to be the most interesting. There are many islands in Lake Erie, of which Kelley's and South Bass Islands are among the larger ones; both possess the same rocks as the other islands do, viz: Kelley's Island the corniferous limestone, South Bass Island the so-called waterlime, a limestone—or rather magnesian limestone rock, containing up to over 40 per cent. of magnesium carbonate. On these islands a new world of plants seems to have appeared to even the botanist who is familiar with all plants on the lakeshore. After hardly putting his feet on the shore of the last-named island, *Dianthera americana*, *Lin.*, a plant growing in water, greets him, and from the rocks the white, often reddish tinged flowers of *Allium cernuum*, *Roth*, nod at him. In rocky places often moistened by water there grows abundantly *Lythrum alatum*, *Pursh*, and near by the beautiful shrubby *Hypericum Kalmianum*, *Lin.*, as also *Lobelia Kalmii*, *Lin.*, and on the top of the rocks, the surface of the island, *Astragalus canadensis*, *Lin.*, and *Smilacina stellata*, *Desf.*; in the woods near by, however, *Herb Robert*, *Geranium Robertianum*, *Lin.*, is found in great quantity, and often *Parietaria pennsylvanica*, *Muhl.* *Rhus canadensis*, *Marsh.*, a shrub, several feet high, with red berries, containing much citric acid, grows here and there in flocks, while *Juniperus virginiana*, *Lin.*, sometimes in old remarkably crooked specimens, surprises by its abundance. In open places of the woods there occurs frequently *Arenaria Michauxii*, *Hooker f.*, more rarely *Thaspium barbinode*, *Nutt.*, and on one single rock on the shore is found *Houstonia purpurea*, var. *longifolia*, *Gray*. It would carry the botanist too far, if he would mention all the interesting species found here; the pretty *Campanula rotundifolia*, var. *arctica*, *Lange*, the large blue bells of which reflect in the water below the rocks, may, however, yet be cited, as also *Viburnum acerifolium*, *Lin.*, *Steironema lanceolatum*, *Gray*, and *Chenopodium hybridum*, *Lin.* Such a rich flora as South Bass Island possesses, was not given to Kelley's Island, which lacks greatly the forest and the huge rocks on the shore. Several of the above species, however, were also seen here. Of new plants the following only could be added to the list: *Verbena angustifolia*, *Mich.*, *Taxus canadensis*, *Willd.* (both in rocky places), *Eriophorum lineatum*, *Benth.* and *Hook.*, (on moist meadows), and *Nelumbo lutea*, *Pers.*, (in the water of a pondlike swamp), which last magnificent herb occurs in other parts of the district more

¹ As an illustration to, and a proof of, this difference, the fact may be stated here, that grapes can be grown in Northern Ohio to advantage only on the islands and within about five miles of the lakeshore, while in more southern parts the frost damages them or their fruit considerably.

abundantly than here. Although surrounded by water and thereby doubtless provided with a damp atmosphere, yet both these islands cannot boast of any ferns, if the few specimens of *Polypodium vulgare*, *Lin.*, seen on the highest rocky part of Kelly's Island, are excepted. On the low sandy parts of the islands the botanist meets many of the plants which usually occur also on the lakeshore and in the adjacent swamps.

After having at this point finished his expedition to the islands, he returns to the fields of his home; the steamer carries him over the greenish water of the lake in several hours' time and after a short rest (sometimes very necessary on account of the rough treatment of him by the waves), and after having well arranged all the specimens collected, he is prepared to explore the lakeshore and the swamps near it. The sandy (or clayey) shore of Lake Erie, over which, particularly in warmer weather, there often hovers an atmosphere more or less saturated with water, provides an habitation to many rare plants; for instance, to *Cakile americana*, *Nutt.*, *Polanisia graveolens*, *Raf.*, *Euphorbia polygonifolia*, *Lin.*, *Strophostyles angulosa*, *Ell.*, *Triodia purpurea*, *Hack.*, *Cenchrus tribuloides*, *Lin.*, *Sporobolus cryptandrus*, *Gray*, as apparently also to *Bidens bipinnata*, *Lin.*, which was seen in but one place on a stony slope, and to *Gentiana crinita*, *Froel.*, *Calamagrostis longifolia*, *Hook.*, *Potentilla anserina*, *Lin.* The swamp situated on and near the shore, mainly that of the Cuyahoga valley on Whisky Island, the gradual disappearance of which the botanist regrets very much, furnishes him (or did furnish within the last years) with *Lysimachia thyrsiflora*, *Lin.*, the splendid *Hibiscus Moscheutos*, *Lin.*, *Eclipta alba*, *Hassk.*, *Phragmites communis*, *Trin.*, *Scirpus polyphyllus*, *Vahl*, *Proserpinaca palustris*, *Lin.*, and *Decodon verticillatus*, *Ell.*, a shrub frequent in many swamps throughout the lake region. The presence of *Pedicularis lanceolata*, *Michx.*, and of *Juncus Gerardi*, *Loisel.* (2 tufts only), may be mentioned here. In parts further west (in Ottawa County) a great bog on L. S. R. R. near Gypsum awakened the botanist's interest by the presence there of *Solidago Riddellii*, *Frank*, *Hypericum gymnanthum*, *Engelm.* and *Gray*, *Prenanthes racemosa*, *Michx.*, and of the *Lythrum* of South Bass Island, *L. alatum*, *Pursh.* The fields between Gypsum and Port Clinton, although not of a swampy nature, but nevertheless under the influence of moisture, being bounded on the south by Sandusky Bay and on the north by Lake Erie, should also be considered here. Within half an hour's time the botanist could collect here: *Euphorbia dentata*, *Michx.*, *Silphium terebinthinaceum*, *Lin.*, *Spartina cynosuroides*, *Willd.*, *Lophanthus nepetoides*, *Benth.*, and *Rudbeckia triloba*, *Lin.*, with its yellow rays and dark purple disks. He has now reached the lakeshore; in sandy places he finds *Panicum virgatum*, *Lin.* Further east, however, a big swamp is situated, which the botanist can only partly penetrate. Millions of the common *Scirpus pungens*, *Vahl*, grow there, but also up to 5 feet high the *Boltonia asteroides*, *L' Her.*, with innumerable flowers. Tired as he is by his attempt to walk through the dense vegetation there, he leaves this place, turning his steps southward to the rich woods, where he meets *Polymnia canadensis*, *Lin.*, and the interesting *Xanthoxylum americanum*, *Mill.*; *Sicyos angulatus*, *Lin.*, covers these bushes and shrubs up to 20 feet high. Further northeast the woods lose their richness of soil, disappear then almost entirely, sand takes their place, the proper material for the growth of *Gerardia purpurea*, *Lin.*, and *Triodia cuprea*, *Jacq.*

Catawba Island has now been reached ; the botanist did not recognize it, as a narrow road connects the same with the territory just left ; moreover, in a dry summer no water can be seen in the lake arm. Rocks commence to appear, the biggest of which is Sugar Rock ; from the top of it his eyes glide down to the shore ; and he can stay there no longer ; a magnificent specimen of *Hibiscus Moscheutos*, *Lin.*, with large light rose-colored flowers, calls him down. Near-by in fissures of the rock grows *Liatris scariosa*, *Willd.* (with handsome rose-purple flowers and corms or tuber-like roots) ; *Solidago ulmifolia*, *Muhl.*, and *Lespedeza violacea*, *Pers.*, soon appear. A big swamp then makes his heart rejoice, for it is full of *Nelumbo lutea*, *Pers.* Of course, he is now unable to go forward, he cannot pass without having pressed several specimens against his bosom, which the deep mud of the swamp, however, had almost prevented him from doing. Ottawa City, a beautifully situated small place, opposite Mouse and South Bass Islands, with a shore formed entirely of rocks is then reached ; the botanist, after having secured fine specimens of *Euphorbia commutata*, *Engelm.*, closes his investigations here for the present time and returns on a road leading through orchards of peaches and pears to his starting point, Gypsum, and to the railroad which brings him home late in the evening.

After a recreation of several weeks, the botanist, finding that he has left in the vicinity of Catawba Island quite a territory unexplored, takes the cars to Sandusky, from which place a steamer will convey him to Lakeside, situated on a peninsula in Ottawa County. This place is a summer resort visited by many people in order to strengthen themselves or to regain their health. He has, however, neither motive nor time to stay ; he immediately goes forward to the quarries and into the woods and fields to gather whatever he can find of plants new to him. The decomposition of the corniferous limestone furnishes here as on Kelley's Island the soil on which the vegetation lives. Very soon he discovers *Symphoricarpus racemosus*, *Michx.* (known by its snow-white berries in winter), as also *Ceanothus ovatus*, *Desf.*, *Calamintha Nuttallii*, *Gray*, *Asclepias verticillata*, *Lin.*, *Acerates viridiflora*, *Ell.*, *Isanthus coeruleus*, *Michx.*, *Scutellaria parvula*, *Michx.*, and *Cercis canadensis*, *Lin.*; even on the debris taken from quarries at the near-by Marblehead he finds the renowned medicinal plant, the horehound, *Marrubium vulgare*, *Lin.*, accompanied by the not less important catnip. He stays there over night and his absence from home having been limited to 2 days, takes the first steamer to Sandusky and there another to Cedar Point (in Erie County). This is a neck of land, a peninsula, several miles long, but very narrow and bounded by Lake Erie on one side and by Sandusky Bay on the other; it is, with the exception of a small area covered with woods (near its point and on the Bayside), nothing but drift-sand deposited there by the lake-waves. No sooner has the botanist put his feet on the shore than his astonished eyes meet several species of plants unknown to him. It takes him hardly a minute to decide which one to examine first; he walks up to the nearest at hand, accidentally the nicest one also: it is *Tradescantia virginica*, *Lin.*, and the other ones follow: *Artemisia canadensis*, *Michx.*, *Potentilla supina*, *Lin.*, *Cyperus Schweinitzii*, *Torr.*, and *Carex Houghtonii*, *Torr.* Stepping further up he finds *Juncus balticus* var. *littoralis*, *Engelm.*, *Festuca tenella*, *Willd.*, *Glyceria nervata*, *Trin.*, *Sporobolus cryptandrus*, *Gray*, *Lithospermum hirtum*, *Lehm.*, *Habenaria fimbriata*,

R. Br., *Ammophila arundinacea*, *Host.*, *Salix longifolia*, *Muhl.*, with very silky leaves, *Silene antirrhina*, *Lin.*, *Arctostaphylos Uva-ursi*, *Sprengel*, *Potentilla arguta*, *Pursh*, *Panicum scoparium*, *Lam.*, the introduced *Panicum miliaceum*, *Lin.*, *Stipa spartea*, *Trin.*, the porcupine grass (with twisted awns up to 6 inches long), and the most interesting of all, *Opuntia Rafinesquii*, *Engelm.* This yellow-flowered member of the cactus family, which until now was known to grow only at the Atlantic Ocean and near the Mississippi River, seems to be in its proper place here also, for it thrives luxuriously, forming groups up to 6 feet in diameter. Dissimilar from its relatives, inhabitants of a warmer climate, it lives in Northern Ohio where in winter time all life seems to be extinct by frost; evidently it is the mild climate of this track of land which allows this *Opuntia* to grow here and to survive the winter, while the nearly tropical heat prevailing in summer on these sand-fields is just the temperature which it likes and which suits it. Notwithstanding the interest which the botanist on seeing this peculiar plant, shows in the same, he approaches it slowly and prudently, knowing that, in consideration of the many short bristles and the long spines, a too strong contact with it would be felt painfully by him. After having secured several specimens, he cannot stay here longer, the whistle of the steamer reminds him to return home; he throws one more look at the sand-dunes on the lakeshore side at the *Ammophila arundinacea* and the deformed old red cedar growing on them, passes big specimens of *Quercus imbricaria*, *Michx.*, and boards the steamer soon after.

[To be continued.]

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, February 16, 1892.

On motion of Mr. Webb, Alonzo Robbins, Ph.M., was called to the Chair.

Minutes of the last meeting were read, and no corrections being required, they were approved.

A paper upon *commercial specimens of scammony* was read by Horace W. Umstead of the present senior class, who also exhibited specimens of the different lots examined.

It was asked by one of the members present whether the resins obtained were tested for the presence of podophyllin, as the tests mentioned would not discriminate between jalap resin and podophyllin.

A paper on *codeine sulphate* was read by Joseph W. England, Ph.G. Mr. Procter said that both the alkaloid and sulphate were largely used, and Mr. Beringer stated that the alkaloid was used largely in pills, and the sulphate in mixtures. The dose was inquired about and it was said to be given in doses of eighth, fourth and half-grains, while one manufacturing pharmacist was making one grain pills; generally the dose is stated as being about twice that of morphine.

A paper on *oleoresins*, by G. M. Beringer, Ph.G., was read, and many specimens of these preparations were exhibited by the author. Professor Maisch said that the quantity of fatty matter extracted from capsicum by the various menstrua depended very greatly upon the presence or previous removal of the seeds, the albumen of which contains notable quantities of fatty matter; he

thought, however, that the preparation would be hot enough even if it contained all the fat present in the seeds. Respecting the rhizome of male-fern, as prepared for the market in Europe, Prof. Maisch said that it was sometimes split longitudinally to facilitate its drying, and that this practice was objectionable on account of the exposure of a large surface to the oxidizing action of the air, the pale green color of the fresh rhizome being thus rapidly altered to brownish red.

A paper upon the reaction of *hydrogen peroxide upon metallic oxides*, was read by F. X. Moerk, Ph.G., and elicited much discussion.

Mr. McIntyre said that he had great satisfaction in listening to the reading of the paper, which had taught him that physicians when prescribing remedies new to them, and of which they knew but little, had better leave well enough alone and not mix things, which may produce results entirely undesired. Mr. Procter said the paper covered a very extensive field in a very thorough manner, so as to be a standard reference upon the subject.

Prof. Maisch exhibited a rhizome of *Maranta arundinacea*, sent to him from Bermuda, by Mr. G. H. Summers, of Philadelphia. This specimen was dug about the first of the year, and is not nearly as large as the "sticks," as they are called by the growers, usually are at the time of collection in April or May. Last year's crop in Bermuda amounted to 180,000 pounds, yielding about 12 per cent. of the fecula, of which only a small proportion is shipped to the United States, mostly to Baltimore, while the balance is sent to London. Larger quantities of maranta arrow-root are received in the United States from other localities. Prof. Maisch had also received from Mr. Summers from Jamaica and exhibited a branch with leaves and fruit of *Vanilla planifolia*, so-called from the remarkable flatness of the leaf. Another variety of vanilla was exhibited, the botanical name of which he was unable to ascertain; it differs in the size and character of the leaf and fruit, the latter being short and of a straight growth, while the officinal vanilla is curved at its base, forming a hook. In answer to a question he stated that cultivated vanilla bean is much finer in flavor and odor than the fruit of the wild-growing plant; these qualities are in part due to the manner of "curing" the bean; but climatic influence must also be admitted, as the same plant grown in the island of Bourbon is of a somewhat different flavor.

Mr. Beringer exhibited a specimen of the flowers of *Acacia Farnesiana*, a product of Florida, used in perfumery, under the name of *cassie*. Professor Maisch stated that last spring he saw the plant in several places in the Southern States, where it is grown for ornament.

Replying to several inquiries, Mr. England gave the following formulas:

Niemeyer's pills, used for dropsical affections:—Each pill contains one grain each of powdered digitalis, powdered squill and blue mass.

Phthisis Pills.—Each contains one-sixth of a grain of powdered opium, one grain powdered digitalis and one grain sulphate of quinine.

Anæmia pills.—Each pill contains two grains each of potassium carbonate and exsiccated sulphate of iron. These pills are very similar to Blaud's pills.

The subject of the prevention of the adulteration of food and drugs by the National Government, which was announced for discussion at this meeting, was postponed in consequence of the lateness of the hour, and a motion to adjourn was carried.

T. S. WIEGAND, *Registrar*.

EDITORIAL.

The Flückiger Memorial.—After a long period of activity as a teacher of pharmacy and pharmacognosy, Professor Flückiger is about to vacate his chair at the University of Strassburg, with the view of enjoying the well-merited rest. The hearty good wishes of hosts of pharmacists and scientists will follow him to his retirement. To give, in a measure, expression to the sense of obligation for his numerous contributions to science in general, and to pharmacy in particular, an international committee has been formed, representing nearly every country of Europe, as well as each of the remaining continents. This committee has issued an appeal which explains itself, and which we publish in full with the names of the members of the committee attached.

APPEAL.

At the end of this term Professor Flückiger, of Strassburg, gives up his university career in order to retire to private life in Switzerland, his native country. Since he first became University teacher in 1861, he has given to the whole pharmaceutical world such wealth of valuable work, and has been so indefatigable, both as teacher and investigator, that we deem it our duty to thank him in due form. For this reason a committee has been formed of the representatives of every nation to collect contributions that we may express our gratitude to this scholar who is so well-known in all places where the pharmaceutical, chemical and pharmacognostical sciences are studied.

In the first place we think of drawing up an address with the signatures of the donors; secondly, we think of collecting the photographs of friends and colleagues in all countries; then we want to have a "Flückiger Medal" struck, on the further destination of which Prof. Flückiger himself will have to determine; and lastly, we purpose—if means permit—to establish a "Flückiger Foundation."

The committee here named wish to bring this before as many as possible of those who are interested in the same branches of science, and who can estimate the worth of Flückiger's works.

Each of the members of the committee will be glad to receive contributions, which may also be sent directly to Professor Tschirch at Bern (Switzerland). Photographs, if possible in carte-de-visite (or cabinet form), should be sent to Prof. Tschirch.

We beg that the name of the donor be inclosed with the photograph or donation on a piece of white paper 50 millimetres broad.

THE FLÜCKIGER COMMITTEE.

J. Attfield, Ph. D., M.A., F.R.S., F.I.C., F.C.S., Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain, in London, W. C., 17 Bloomsbury Square.—*Dr. H. Beckurts*, Professor of Pharmaceutical Chemistry at the Technische Hochschule of Braunschweig.—*Dr. R. Böhm*, Professor of Pharmacology to the University of Leipzig.—*Dr. Chr. Brunnengrüber*, Senator at Rostock.—*Dr. L. A. Buchner*, Obermedizinalrath, Professor of Pharmacy to the University, and Mitglied der Akademie der Wissenschaften in München.—*M. Carteighe*, F.I.C., F.C.S., President of the Pharmaceutical Society of Great Britain in London, W., 180 New Bond Street.—*Alphonse De Candolle*, Membre de l'Institut in Geneva.—*Dr. R. Demme*, Professor of Phar-

macology to the University of Bern.—*Dörrien*, Vorsitzender des Deutschen Pharmaceutenvereins in Berlin, N. Friedrichstr., 125.—*Dr. G. Dragendorff*, Professor of Pharmacognosy in Dorpat (Russia).—*W. Dymock*, M.D., in Bombay (India).—*Dr. A. Engler*, Professor of Botany and Director of the Botanical Gardens, Mitglied der Akademie der Wissenschaften in Berlin.—*Dr. L. Fischer*, Professor of Botany and Director of the Botanical Gardens in Bern.—*Dr. R. F. Fristedt*, Professor of Pharmacology to the Royal University in Upsala.—*Herm. Traug. Fritzsche* in Firma: Schimmel & Co. in Leipzig and Fritzsche Brothers in New York.—*M. Frælich*, Vorsitzender des Deutschen Apotheker-Vereins in Berlin, N. Auguststr., 60.—*Dr. Aug. Garcke*, Professor of Botany in Berlin, Gneisenaustr., 20.—*Dr. E. Geissler*, Professor of Chemistry to the Thierarzneischule in Dresden.—*Dr. Giacosa*, Professor of Pharmacology and Physiological Chemistry to the University in Torino (Italy).—*Dr. Torquato Gigli*, Professore nella scuola tecnica in Pavia.—*Dr. Greshoff*, Chef van de 4^{te} Afdeeling of the s'lands plantentuin in Buitenzorg (Java).—*Dr. Hilger*, Hofrath, Professor of Pharmacy and Practical Chemistry in Erlangen.—*Dr. Fr. Hoffmann*, in New York (U. S. A.), 183 Broadway.—*Dr. Th. Husemann*, Professor of Pharmacology and Toxicology in Göttingen.—*Dr. Kobert*, Professor of Pharmacology at the University of Dorpat.—*Dr. Lubolt*, Commerzienrath, in Firma: Gehe & Co., in Dresden.—*H. P. Madsen*, pharm. chemist in Kopenhagen.—*John M. Maisch*, Ph.M., Phar. D., Professor of Materia medica and Botany in the Philadelphia College of Pharmacy, in Philadelphia (U. S. A.).—*K. F. Mandelin*, in Wasa (Finnland).—*Dr. R. Marloth*, in Capetown (South Africa).—*Dr. J. Möller*, Professor of Pharmacology and Pharmacognosy to the University in Innsbruck.—*F. von Müller*, Government's botanist in Melbourne (Australia).—*Morten Nyegaard*, in Christiania.—*Dr. C. A. J. A. Oudemans*, Professor of Botany and Pharmacognosy to the University in Amsterdam.—*Dr. Peckolt*, in Rio de Janeiro (Brasil), Rua da quilanda.—*A. Petit*, Président de l'Association générale des Pharmaciens de France in Paris, 8 Rue Favard.—*Pfersdorff*, pharm. chemist in Strassburg i./Els.—*Dr. G. Planchon*, Directeur de l'École supérieure de Pharmacie à Paris, Membre de l'Académie de médecine, 4 Avenue de l'observatoire.—*Dr. Th. Poleck*, Geh. Regierungsrath, Professor to the University and Director des pharmaceutisch-chemischen Institutes in Breslau.—*Dr. F. B. Power*, Professor of Pharmacy and Materia Medica to the School of Pharmacy of the University of Wisconsin in Madison (U. S. A.).—*Dr. Th. Sandahl*, Professor of Materia Medica at the Kongl. Carolinska Institutet and Professor of Pharmacognosy to the Pharm. Institute in Stockholm.—*E. Schär*, Professor of Pharmacy and Vorstand der pharmaceut. Abtheilung des eidg. Polytechnikums in Zürich.—*Dr. E. Schmidt*, Professor of Chemistry and Direktor des pharmaceutisch-chemischen Institutes in Marburg i./H.—*Dr. Junichiro Shimoyama*, Professor of Pharmacy of the College of medicine of the Teikoku Daigaku (University) in Tokyo (Japan).—*Dr. Eduard R. Squibb*, 56 Doughty Street, Brooklyn, New York (U. S. A.).—*Dr. Lud. Stahre*, Prof. of Chemistry and Pharmacy to the Pharm. Institut in Stockholm.—*Stanford*, E. T. C., F. I. C., F. C. S., President of the British Pharmaceutical Conference, Glenwood, Dalmeir, Dumbartonshire.—*Dr. W. Stæder*, Professor of Pharmacy to the University in Amsterdam.—*Dr. H. Thoms*, Vorsitzender der Pharmaceut. Gesellschaft in Berlin, N. Neue Hochstr. 6.—*Dr. Wladimir Tichomirow*, Professor of Pharmacy and Pharma-

cognosy to the University in Moscow.—Dr. *Jul. Trapp*, Professor, kais. russ. Geheimrath, Excellenz, in St. Petersburg.—Dr. *A. Tschirch*, Professor of Pharmacognosy and Director des Pharmaceut. Institutes to the University of Bern (Switzerland).—Dr. *Aug. E. Vogl*, Hofrath, Professor of Pharmacology and Pharmacognosy to the University of Wien.—Dr. *J. E. de Vrij*, in Haag (Holland).—*A. von Waldheim*, Director des Oesterr. Apotheker-Vereins in Wien.—*Fr. Weber*, Präsident des Schweiz. Apotheker-Vereins in Zürich.—Dr. *Alb. Weller*, Director der Vereinigten Fabriken chem.-pharmac. Produkte Feuerbach-Stuttgart and Frankfurt a./M., Zimmer & Co., in Frankfurt a./M.—Dr. *J. Wiesner*, Professor of Anatomy and Phys. of plants to the University, Mitglied der Akademie der Wissenschaften in Wien.

Correction.—The article on page 99 of our last number on the “estimation of iodoform” was selected from *The Analyst*, 1892, page 7. Through an oversight, the concluding paragraphs were omitted, namely, a table of analytical results proving the correctness of the proposed method, and the following additional information :

The method does not take more than half an hour to perform, and is therefore practical. Should the iodoform be obtained in ethereal solution, as for instance, in the estimation of acetone, the ether need not be evaporated, but can be mixed directly with the alcoholic soda. No danger of loss of iodoform need be feared, and it is not necessary to use an inverted condenser.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Handbuch der Arzneimittellehre. Mit besonderer Rücksichtnahme auf die neuesten Pharmakopöen für Studirende und Aerzte bearbeitet von Dr. Theodor Husemann, Professor der Medicin an der Universität Göttingen. Dritte Auflage des Handbuches der gesammten Arzneimittellehre. Berlin. Verlag von Julius Springer. 1892. 8vo. Pp. 687.

Handbook of Materia Medica, with special reference to the latest pharmacopœias ; for students and physicians. Price, bound, 10 marks.

Although the work before us is stated to be the third edition of the author's extensive medical work on materia medica, it may be viewed as a new work, written in a more condensed style so as to be adapted to the uses of the medical student, and at the same time be useful for consultation by practitioners of medicine. The scope of the work embraces, besides the remedies of the German pharmacopœia, also those dismissed by this authority, but still in use ; as well as those of the recent Austrian pharmacopœia, and remedies of other countries possessing sufficient interest for the physician of central Europe. Naturally we may expect to find accounts also of those modern remedies, which of late years have been introduced in large number, and have been recommended as valuable, though, as the author remarks, many of these acquisitions to therapeutics will, after a brief renown, again become obsolete.

The book is divided into two parts, general and special materia medica, the former beginning with a chapter on the derivation and nature of remedies, then discussing pharmacodynamics in a general manner, and concluding with a more lengthy chapter on the art of prescribing medicines. This latter explains the manner of correctly formulating prescriptions, and then gives special descriptions and directions regarding the different forms of medication,

which are divided into four classes: solid, soft, liquid and gaseous forms. Under the first group are comprised species, powders, pills, plasters, soaps, suppositories, caustic pencils, etc.; the second embraces electuaries, jellies, poultices, pastes, and ointments; in the third are found the numerous forms of solution and mixtures for internal or external use, including liquores pulverisati (sprays); and the fourth group is formed of vapor baths, fumigations, gas baths and gaseous inhalations. These forms of medication are briefly characterized, their applications are explained, and the manner in which they may be prescribed by the physician is clearly indicated.

The second part of the work treating of special *materia medica*, considers the numerous remedies from the medical standpoint in sixteen classes according to their characteristic action; and these classes are arranged in the following four divisions: Prophylactics; topical remedies; pansomatics (aromatics, bitter remedies, antidyscratics, antipyretics), and teledynamics (neurotics, cardiotonics, dermatics, etc.) The drugs of each class are arranged according to their similarity of action. A brief history and a short but exact description of the drug or chemical, the chief active principle or principles of the vegetable or animal drugs, the behavior to solvents, etc., serve as an introduction to the most important part of the text which gives more in detail the medical action of the article, its therapeutic uses, doses, antidotes, etc., and closes with the galenical preparations into which the remedy enters, and when deemed necessary, with a few prescriptions serving as illustrations of the manner in which these remedies may be prescribed and combined with others.

It need scarcely be stated that important drugs are discussed with much greater minuteness than others of less importance, and that non-pharmacopœial drugs are, as a rule, merely briefly referred to. In all cases the important facts are clearly brought out in that convincing manner, which, owing to the exactness of the statements, is characteristic of the author's literary works. This attractiveness is enhanced by the pleasing garb in which this valuable and useful work is presented by the publisher.

Les Aristoloches. Étude de matière médicale, par Louis Planchon, Docteur en médecine, Pharmacien supérieur, etc., Montpellier: Hamelin Frères. 1891. 8vo. Pp. 266.

A very interesting and valuable monograph on the medicinal species of *Aristolochia*. In the first part, a brief history is given of the genus, followed by the description of its botanical characters, its geographical distribution and its medical properties. The second part treats of the drugs examined by the author, consisting of branches and subterranean parts, and which he divides into three groups, viz: fibrous, of which *A. Serpentaria* and *A. Clematitis* furnish the types for short and elongated rhizomes; woody, the most numerous section embracing the guacos and mil-homens; and tuberous, which are again subdivided into three divisions: round (*A. rotunda*, *pallida*, etc.), long (*A. longa*, *Fontanesi*, etc.), and filipendulous (*A. tenera* and *filipendulina*). These drugs are considered and compared according to their physical and structural characteristics. The third part of the work is devoted to the special study of the medicinal species, nearly one-half of the two hundred known species of *Aristolochia* being considered, more or less extensively, according to their importance and uses. In each case a full list of synonyms is given, with refer-

ences to the literature and critical examination of the figures published by different authors; the history, habitat, admixtures and substitutions, chemical constituents and medical properties are described, with frequent references to the literature on these subjects. It seems somewhat strange that the author speaks of *A. reticulata* as "la fausse serpentinaire;" but it is evident from the text that this term is used solely in distinction to the species yielding the drug originally introduced; for the fact is noted that, like the latter, it is officinal in the United States; also that it is almost exclusively met with in commerce, and that it is the only kind furnished by the wholesale druggists of France, while in that country the root of *A. Serpentaria* is met with only among the antiquated stock of old pharmacies, where it happens to be rarely used.

The critical care bestowed upon this monograph, which is evidenced upon every page, shows that with the author, who is director of the works on natural history in the école supérieure de pharmacie of Montpellier, it was a labor of love; and thus a very valuable work for the student of *materia medica* in general, and of pharmacognosy in special, has been produced.

OBITUARY.

Wilhelm Dankwortt died in Magdeburg, Germany, January 10, 1892, aged 70 years. He was born and educated in that city, and after serving there as apprentice and clerk, continued his studies at the University of Halle, where he passed the state's examination in 1848. In 1852 he became proprietor of a pharmacy in Magdeburg, and retired from active business pursuits in 1890. In 1863 he was elected one of the directors of the North German Apothecaries Society, and became its presiding officer in 1867 until 1872, when the union with the South German Association was effected. He took a very active part in the internal affairs of these Societies, both at the meetings and through communications to pharmaceutical papers; also in the elaboration of the German pharmacopœia, more particularly of its second edition which appeared in 1867. Other publications by the deceased dealt with the examination of flour, milk and certain paints, and the forensic detection of phosphorus. At the third International Pharmaceutical Congress, held at Vienna in 1869, Mr. Dankwortt was elected president. He was also connected with various pharmaceutical and other scientific bodies, as honorary or corresponding member; he was an honorary member of the Philadelphia College of Pharmacy.

Frank Frisby, Ph.G., died at Bismarck, N. Dak., January 18th, in his thirty-third year, of paresis. He learned the drug business at Atchison, Kan., studied at Ann Arbor, and then came to the Philadelphia College of Pharmacy, graduating in 1880, his thesis on *Fucus vesiculosus* being published in the same year in the Amer. Jour. of Pharmacy, p. 434. In 1883 he entered into business in Bismarck. When the Dakota pharmacy law was passed in 1887, he was appointed on the North Dakota Board and elected secretary. He also took much interest in the State Pharmaceutical Association, and contributed several papers to its proceedings. His widow and a little daughter survive him.

Charles P. Pengra, M.D., died in Boston, January 30th. He held the position of Professor of *Materia Medica* and Botany in the Massachusetts College of Pharmacy.

THE AMERICAN JOURNAL OF PHARMACY.

APRIL, 1892.

POLYGALA ALBA.

BY JOHN M. MAISCH.

In the September number, 1889, of the American Journal of Pharmacy, I gave, briefly, a history of the origin of a false senega root, which has been in the market from time to time since 1876, and which, mainly from the close resemblance in the anatomical structure, was supposed by me to be obtained from *Polygala Boykinii*, until a specimen of *Polygala alba*, with roots and flowering stems was procured, the root of which corresponded in every particular with the false senega then offered to a wholesale dealer, and with the several specimens of the same root received by me at various times since 1876; moreover, this plant was procured in the same locality and from the same shippers through whose hands a few bales of this root had been sold annually to dealers and manufacturers. There could be no question that the plant was really the one from which the false senega is derived; it was found to be *Polygala alba*, Nuttall, as stated in my previous paper, and was recognized as a robust form of this species also by Professor John M. Coulter, of Wabash College, whose reply to my inquiry had been delayed, owing to his absence from home, and did not reach me until after the publication of my paper in September, 1889. About the same time I learned also that the same plant had been shown to Professor H. H. Rusby, of New York, and recognized by him as the species named.

Professor Lloyd supposing this false senega to be identical with the senega collected in Wisconsin and contiguous States from a supposed variety of *Polygala Senega*, intermediate between the typical form

and the variety *latifolia*, reported his views to the American Pharmaceutical Association in 1881, and exhibited numerous specimens of the root of this supposed variety, all of which were at once declared to differ very essentially in all physical properties from those of the false or white senega, by those who had paid some attention to the latter drug (see *Proceedings, A. P. A.*, 1881, p. 522). In a paper published by Prof. Lloyd in the *Pharmaceutische Rundschau*, 1889, it is stated, p. 88, that he has met with bales of southern senega root of excellent quality, but entirely destitute of the keel. Not having seen this root it is impossible to speak with certainty of its identity with that of white senega; but as figured in the paper quoted (*loc. cit.*, p. 87) it certainly strongly resembles the latter. Recently another paper by Professor Lloyd was published in the *Pharmaceutische Rundschau*, March, 1892, in which it is stated that the "supposed substitution or adulteration, believed to have been observed by Wm. Saunders (1876), J. M. Maisch (1877), etc., were shown to be unimportant or incorrect (unwesentlich oder unzutreffend)," and that this "obviously applies likewise to a senega root received by a New York drug firm, from Kansas, which Prof. Maisch supposed to be derived from *Polygala alba*."

Regarding the first part of this quotation, I may be permitted to reiterate once more what I have repeatedly stated before, that I have never asserted senega root to have been *adulterated* with white senega, since I have seen the latter on the market *only as a substitute* for the former; but on the other hand I have not denied the *possibility* of such intentional adulteration. While recognizing the medicinal utility of white senega root, I do not regard it as equal to that of the officinal senega, and for this reason cannot agree that such substitution is unimportant. Ever since I have first known this white senega root, in 1876, I have held it to be procured from a species differing botanically from *Polygala Senega*, and while I was at one time mistaken as to the identity of the parent plant of white senega, every doubt has, in my opinion, been removed in 1889. Professor Lloyd's assertion of incorrectness in this respect has certainly not been proven by him. *Obviously* this applies in like manner to the second part of the quotation. It is, however, perfectly correct that there was a time when I *supposed* the white senega to be derived from *Polygala alba*; but when this supposition, based upon the characters of a botanical specimen—root with flowering stems

—was verified by the verdict of the botanists mentioned in my former (1889) and the present paper, all of whom had either seen the root or were informed of its dimensions, it would have been more than presumptuous on my part to doubt the identity of the plant.

The main object of Prof. Lloyd's paper is to prove the great scarcity (?) of *Polygala alba*, which he maintains cannot be taken into consideration, either as an accidental or intentional admixture of, or for being mistaken for, senega, and that reference to it in text-books on pharmacognosy should be omitted as not supported by facts ("gegenstandslos"). To these conclusions I most decidedly object as not being warranted by the facts. As to Professor Lloyd's aim to prove that the roots of the two species of *Polygala* cannot be profitably collected in the same localities, that point is conceded without reserve; for as far as I am acquainted with the literature on *P. alba*, its true home is farther west and southwest than that of *P. Senega*; and because the former species, as far as known, does not grow in Iowa, Minnesota and Manitoba, efforts made by him to obtain specimens from those localities were, naturally, doomed to be unsuccessful. The root of *P. alba* has thus far come into the market only from southwestern Missouri and from Kansas, and notwithstanding my ill success in former years, living plants could, probably, have been procured more readily in the localities named. When Prof. Lloyd states (*loc. cit.*, p. 52) that he had not found a botanist who had ever met with the living plant, the statement is doubtless intended to refer only to those States in which the true senega is collected for commercial purposes, since Prof. S. M. Tracy, of Mississippi, is quoted as having observed *P. alba* and *P. Senega* never to grow in the same localities, and the former to be scarce even in its most luxurious stations in that State.

Among the botanists corresponded with is also Prof. Thos. Meehan, of Philadelphia, who, it is stated (*loc. cit.*), "being in frequent interchange with botanists and collectors of plants in the different States, endeavored to procure specimens and information concerning the habitat of *P. alba*, but entirely without success." Now, Mr. Meehan is one of the most active members of the Academy of Natural Sciences, and of its Botanical Section, and is very thoroughly acquainted with the Academy's herbarium which contains many specimens of the species named from a number of different

localities; it appeared to me that his inquiries could scarcely have been directed to the home of the plant west of the Mississippi River; and upon inquiry as to the correctness of this supposition he kindly replied as follows: "The statement you quote makes the fact of my not getting the specimens seem more strongly negative than the real facts would warrant. I gave my herbarium away several years ago as that of the Academy of Natural Sciences is convenient, and I am not, therefore, in frequent interchange with botanists; and in regard to this particular case—not knowing that it was a matter of so much importance I did not make the great effort that the remarks would seem to indicate. I had a note from Prof. Cope simply asking if I could get specimens of the plant. I sent to two of my best friends in Alabama and Tennessee and they reported that it was extremely rare, and that they could not get it; but I did not write to friends on the other side of the Mississippi. If I had been asked to make the extra exertion to procure specimens, I would have spent much more time than I thought necessary when the application was made to me."

That Mr. C. G. Lloyd, in exchanging with others, has never been offered *P. alba*, is not an argument in favor of either the rarity or the frequency of the plant; nor is the fact that Prof. Lloyd's correspondence resulted in obtaining specimens from six localities in Mexico, Texas, Kansas, North Dakota and from California, the latter stated to have been procured from the U. S. Agricultural Department. Among the Polypetalæ of the "Flora of California," by W. H. Brewer and Sereno Watson, the species is not mentioned. On this and some other points it was to be presumed that reliable information could be had from the U. S. Department of Agriculture; and in reply to my inquiries, Dr. Geo. Vasey, the accomplished botanist of the Department, furnished the following:

(1) The National Herbarium contains many specimens of *Polygala alba*.

(2) The root seldom attains 5 mm. in diameter, but often grows 30 cm. long. In young plants the root is much slenderer.

(3) The plant is known to occur in Louisiana, Texas, New Mexico, Arizona, Arkansas, Kansas, Nebraska and Dakota. The California locality is probably a mistake.

(4) It is abundant in many places in the Great Plains from New Mexico northward to Dakota.

It is not stated in Prof. Lloyd's paper whether his specimens were accompanied by roots; but it is mentioned that all these *plants* were much smaller than the *Pol. Senega* gathered in Kentucky, and that the North Dakota plants grow only to the height of 5 to 7 inches, and have only small roots. Heretofore I have quoted from the floras of the Northern United States, the Southern United States and the Rocky Mountain Region, showing that the plant attains a height of 12 inches. Still as the height of the stem is no indication of the dimensions of the root, the information kindly given by Dr. Vasey applies more directly to the question at issue. In my paper of Septb., 1889, I give the diameter of the root for the portion beneath the head, *i. e.*, immediately beneath the stem remnants, while Dr. Vasey's measurement, as given above, obviously applies to the body of the root. Comparing the measurements we have:

Length of root: 30 cm. (*Dr. V.*); 4 to 6 inches = 20 — 30 cm. (*M.*).

Diameter: 5 mm. (*Dr. V.*); $\frac{1}{4}$ inch = 6 mm, few roots (in the commercial article) $\frac{1}{8}$ inch = 3 mm., some $\frac{3}{8}$ inch = 9 mm., rarely $\frac{1}{2}$ inch = 12 mm. (*M.*). These figures speak for themselves.

Referring to the fact that *P. alba* does either not grow, or is very scarce, in the districts where *senega* is collected, Prof. Lloyd suggests that "possibly it is more frequent in the arid plains of Arizona, New Mexico and in Mexico, but from all appearances even there only in limited tracts." This suggestion is corrected by Dr. Vasey's answer; and as a supplement to it may be quoted Prof. J. M. Coulter's Manual of the Plants of Western Texas, where *Pol. alba* is reported to grow in "sandy soil throughout Texas; apparently the most common *Polygala*."

While in my opinion the facts presented above fully sustain my position in regard to the origin of white or false *senega*, additional and I think even stronger evidence of its origin from a species differing from *Pol. Senega*, is to be found in the structure of the two roots, as I pointed out in 1877, described briefly in 1881, and illustrated in the National Dispensatory and in my Manual of Organic Materia Medica by sketches drawn from sections of the two roots. These differences may be briefly summed up as follows: The root of *Pol. alba* shows upon transverse section a circular wood surrounded by a bark of uniform thickness, the thin layer of the inner

bark being likewise of uniform width or, in very young roots, absent, because not yet developed. The structure of the root of *Pol. Boykinii* agrees with this description. On the other hand, the transverse section of the root of *P. Senega* always shows a more or less irregular wood, and an irregular development of the inner bark, no two sections of the same root being exactly alike; even in those thick roots in which the medullium shows apparently a circular growth, it is easily observed, on closer examination, to be of irregular development, most strikingly so in the thinner branches. In other words, in old senega roots grown in rich soil, the irregularity of its structure may become obscured to some extent, but it does not entirely disappear, while no essential change is observed in the uniform structure of young and old roots of *P. alba*.

The conditions pointed out were again observed in a specimen of "northern senega" described by Prof. Sayre in Amer. Jour. Phar., March, 1892, p. 113, and kindly supplied by him. Of the 15 roots of which the sample consisted, seven roots were quite small and immature, weighing together only 3 gm. (46 grains); they are pale colored and show the keel very plainly in all parts. In the remaining eight dark-colored roots some of the thinner portions and of the branches were missing. Four of these roots, weighing 10.4 gm. (160 grains), likewise showed the keel, though less prominently in their upper parts. In two roots, weighing 8.7 gm. (134 grains), mere indications of the keel could be observed in the root body, but the branches showed it distinctly. The remaining two roots, or rather parts of roots, weighed 13.94 gm. (215 grains); the external indications of the keel were quite doubtful, and could not be distinguished from the longitudinal wrinkles of the root due to the shrinkage of the tissues by drying. The internal structure, however, gave abundant evidence of identity with that of the smaller roots. These roots having been collected in the same locality furnish proof that the external restriction and apparent disappearance of the keel can occur only in old senega roots of robust growth. Analogous conditions have never been recorded in the case of the keelless white senega which consists of the naturally thinner roots of *Polygala alba*.

Nitroglycerin.—Ten drops of a $\frac{1}{100}$ solution have been administered hypodermically in the complete asphyxia of drowning, with marvellous results.—*Quar. Ther. Rev.*, Jan., 1892.

AN EXAMINATION OF SOME OFFICIAL PREPARATIONS.

BY HENRY TRIMBLE.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy,
 No. 107.

It has been the custom of the author for several years past to have students in the laboratory examine some of the Pharmacopœial preparations. Last year this work was directed more especially to the inexpensive galenicals which are usually prepared by the pharmacist, although in the following list there are a few that are exclusively purchased from the manufacturer.

Tincture of Iodine.—Robert T. Ward purchased one-half ounce samples from the retail stores of Philadelphia. The Pharmacopœia requires 8 per cent. of iodine. An assay of the samples showed them to vary from 3.08 to 16.15 per cent. Two were above the standard and 23 below. Nearly one-half contained about 6 per cent. The sample containing 16.15 per cent. was dispensed in a 2 drachm homœopathic vial, without a label, and was wrapped in a circular. It was prepared while the customer waited, by pouring an unknown amount of iodine into the bottle and filling up with alcohol. The price charged was 10 cents.

Diluted Acetic Acid.—Frank Miller procured 20 samples from retail stores in Philadelphia. With two exceptions they responded fairly well to the official tests of purity, but in strength of absolute acid they varied from 1.80 to 16.20 per cent. It may be recalled here that the Pharmacopœia requires 6 per cent. Exactly one-half were below the standard. The average was 6.24 per cent.

Sulphurous Acid.—Clinton E. Main experienced much difficulty in obtaining samples of this preparation. He was in most cases asked if he did not want sulphuric acid. One clerk informed him that sulphurous acid was dispensed only on prescription. After visiting many stores where it was not kept, twenty-seven samples were finally obtained.

An assay of each showed them to vary from 0.001 to 4.02 per cent. of sulphurous acid gas. The official contains 3.5 per cent. of the gas. Twenty-six of these samples were below the standard and two-thirds of them contained less than one per cent.

Tincture of Chloride of Iron.—William A. Clingan assayed 14 samples of this preparation, purchased from retail stores. Eleven

of these gave results above the requirements of the Pharmacopœia and three were slightly below.

Water of Ammonia.—John W. Hough examined 20 samples of ammonia water. The results indicate that neither of the official preparations is usually dispensed. Twelve of the samples indicated a strength of about 14 per cent., 5 were no doubt sold as a 10 per cent. solution, and 3 indicated considerable dilution with water, the lowest showed a strength of 4.56 per cent.

Diluted Hydrobromic Acid.—Harry Bitler found this acid to be about the 10 per cent. required by the Pharmacopœia. Of 10 samples examined 3 contained tartaric acid, indicating that they had been prepared by the Fothergill formula. Most of the others contained sulphuric acid.

Hydrochloric Acid.—Alexander B. Petrie, Jr., purchased 25 samples of this acid in Philadelphia and Camden. In every case "strong muriatic acid" was asked for. Nine of the samples were found to be chemically pure, and 16 were the commercial acid. Only one was dispensed in a glass stoppered bottle. The percentage strength of absolute hydrochloric acid was found to vary from 20.9 to 37.8. The Pharmacopœia requires 31.9 per cent.

Solution of Chlorinated Soda.—Harry W. Zeamer assayed 25 samples of this preparation purchased in Philadelphia and Camden. He found 3 of these to contain the 2 per cent. of available chlorine required by the Pharmacopœia. One contained no available chlorine, and most of the remainder contained over one per cent. of the active element.

Diluted Nitric Acid.—G. A. Weston examined 25 samples of this preparation and found the percentage strength to vary from 6.27 to 11.72. Two of the samples contained considerable quantities of hydrochloric acid.

Nitric Acid.—Harry C. Mendenhall found in 20 samples of this acid, that they varied from 50.00 to 72.80 per cent. Only one specimen was dispensed with a glass stopper. None contained more than traces of impurity.

Solution of Chloride of Iron.—Charles H. Raudenbush found 14 samples to yield the required amount of ferric oxide. Nitric acid was found in the majority and oxychloride in one-half the samples. One other specimen, although labelled solution of chloride of iron, was found to be the tincture.

SODIUM BENZOATE.

BY HENRY F. KAERCHER.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy,
No. 106.

Read at the Pharmaceutical Meeting, March 15.

This salt is regarded by our Pharmacopœia as crystallizing with a definite amount of water—i. e., one molecule or 11.11 per cent. The result of an investigation by the writer, however, indicates that it contains variable quantities of water, which may be entirely removed at a low temperature.

The first specimen examined was a sample of the salt as found in the market. It corresponded to all the tests of purity. On heating a portion to 200° C., it was found that this temperature was not sufficiently high to decompose it. The amount of moisture obtained by drying to constant weight at 120° C. was 4.59 per cent. Several methods were used to determine whether this dried salt was anhydrous or not—one by igniting and estimating the ash volumetrically as sodium carbonate; the other by estimating the benzoic acid. The latter process was found to give the more accurate results and was accomplished by treating an aqueous solution of the salt with dilute hydrochloric acid, shaking out the precipitated benzoic acid with ether, and allowing the solvent to evaporate spontaneously. The residue on being weighed gave 84.66 per cent. (the theoretical amount in an anhydrous salt being 84.72 per cent.).

The next salt examined was made by granulating at 60° C. Estimation of the moisture gave 18.23 per cent. The same salt crystallized from alcohol, however, gave only 9.01 per cent. (11.11 per cent. being the theoretical amount of one molecule), all of which was removed at 120° C.

An anhydrous salt was obtained by keeping a small quantity of that crystallized from alcohol, in a desiccator over sulphuric acid for several days.

Another sample was made by crystallizing from aqueous solution, displacing adhering water by washing first with alcohol and then with ether, and exposing to the air for a short time. This was found not to be a practical method.

A salt was then made from benzoic acid sublimed from benzoin, by granulating at a moderate heat (below 200° C.). In this prepara-

tion the disagreeable taste of the commercial salt was not noticed. Estimation of the benzoic acid also proved it to be anhydrous.

From this investigation it may be concluded that the commercial salt, as ordinarily prepared by crystallization, is of variable strengths, and that to insure uniformity it should be made anhydrous; also that the benzoic acid sublimed from benzoin gives a much more palatable compound than that made synthetically from toluol.

CALX SULPHURATA AND POTASSA SULPHURATA.

BY WM. G. KLEINSTUBER, PH.G.

Abstract from a Thesis.

Calx sulphurata.—The formula of the U. S. Pharmacopœia directs the preparation of sulphurated lime from 100 parts of lime and 90 parts of sulphur; the reaction taking place may be represented by the equation $13\text{CaO} + 10\text{S}_2 = 8\text{CaS} + \text{CaS}_5 + 3\text{CaS}_2\text{O}_3 + \text{CaSO}_4$; and if no loss occurs this would account for more than 36 per cent. of calcium sulphide required by the pharmacopœia. A fresh specimen, prepared by the pharmacopœial formula, and five commercial specimens, were examined by the process of the pharmacopœia, boiling 1 gm. with 1.25 gm. of crystallized copper sulphate in 50 cc. of water; in case the filtrate contained copper, its amount was determined by precipitation with KHO, igniting and weighing as CuO. The following results were obtained:

Color of specimens.	FOUND.		CaS Per ct.
	CuO	CuS	
Grayish white,	—	0.441 gm.	26
Grayish pink,	0.146 gm.	0.302 "	22.76
Grayish,	0.162 "	0.283 "	21.31
Gray,	0.300 "	0.145 "	8.84
Greenish gray,	0.320 "	0.093 "	6.98
Grayish pink,	0.324 "	0.088 "	6.63

Potassa sulphurata.—If the reaction occurring in the pharmacopœial process be expressed by the equation $3\text{K}_2\text{CO}_3 + 4\text{S}_2 = 2\text{K}_2\text{S}_3 + \text{K}_2\text{S}_2\text{O}_3 + 3\text{CO}_2$, the quantity of sulphur directed should be increased from 1 to 1.23 parts.¹ Working by the pharmacopœial

¹ In this calculation no notice is taken of the water and impurities; the U. S. P. requires Potassii carbonas to contain not less than 81 per cent. of K_2CO_3 .—EDITOR.

process, the products, examined immediately, were found to contain less than the required 58 per cent. of sulphide. The results obtained by assaying the recently prepared and five commercial samples of sulphurated potassa are tabulated below; the process used was that of the pharmacopœia: 10 parts (3.23 gm.) of the compound saturated with 12.69 parts (4.069 gm.) of crystallized copper sulphate and 60 parts of water; the copper still present in the filtrate was determined and weighed as CuO.

Color of specimens.	FOUND.		Potassium sulphide.
	CuO	CuS	
Chocolate-brown, . . .	0.02 gm.	1.541 gm.	55.10 per ct.
Orange-green,	0.272 "	1.230 "	44.39 "
Green, externally, . . .	{ 0.292 "	1.214 "	43.44 "
Brown, internally, . . .	{ 0.350 "	1.141 "	40.95 "
Greenish yellow, . . .	{ 0.460 "	1.012 "	36.21 "
	{ 0.520 "	0.945 "	33.63 "

NOTE ON SODA MINT.

By F. W. HAUSSMANN, PH.G.

Read before the Philadelphia College of Pharmacy at the Pharmaceutical Meeting, March 15.

The substitution of spearmint for peppermint water in this popular remedy is of comparatively recent introduction, older formulas for the same almost invariably ordering the latter. Among pharmacists the change has not altogether been approved, as many still follow the custom of the past or the demand of the public for the better known peppermint flavor. The question whether the substitution is preferable, is rather difficult to answer, and either the affirmative or negative rests entirely with the buyer. Peppermint is certainly better known and perhaps more popular with the average consumer, for while perhaps finding a resemblance in spearmint, the more familiar odor and flavor of the former is almost invariably preferred. From a therapeutic standpoint it is also stated to possess greater stimulating properties, but in this case hardly sufficient to have any decided value. On the contrary, as the remedy is often given to infants, the less stimulating action of spearmint water is to be preferred.

A menthol preparation has been suggested, but presents no apparent improvement. Its slight solubility in water is the main disadvantage. This would be chiefly experienced when making the

preparation extemporaneously, which is frequently the case. If the menthol is dissolved in the aromatic spirit of ammonia, and the water containing the soda is added to the solution, separation immediately takes place. A small portion remains, however, in solution, and the agreeable, cooling menthol taste is present.

Considerable difference exists in the various formulas regarding the amount of aromatic spirit of ammonia in the preparation. Some omit it altogether, while others order as much as one ounce to the pint. The National Formulary directs 60 minims to this amount, which, compared to other formulas, is rather weak. Manufacturers of soda mint tablets, in the ammonia strength as well as in the oil selection, follow the old method. Usually each tablet contains, or is stated to contain, 4 grains bicarbonate of sodium, $\frac{1}{4}$ grain carbonate of ammonium, with $\frac{1}{6}$ drop of oil of peppermint. Calculating on this basis, 80 such tablets will furnish the amount of soda in one pint of N. F. soda mint. The amount of carbonate of ammonia (20 grs.) is, however, the one present in one fluidounce U. S. P. aromatic spirit of ammonia, omitting the free water of ammonia altogether. The National Formulary may, perhaps, be improved upon by increasing the amount of aromatic spirit of ammonia to about $\frac{1}{2}$ ounce.

In connection with this subject a few words on the popular *soda mint tablets* may be in order. The presence of carbonate of ammonium has a tendency to decompose or alter the physical condition of the tablets. They become softer and very friable, and sometimes assume a brown color. Free ammonia is developed through the action of the sodium salt on the ammonium carbonate. This may be observed if a bottle, containing a number, is opened, when the ammonia can be detected by its powerful odor or a little HCl on a glass rod. By prolonged exposure to air, the ammonia almost entirely disappears.

The brown color mentioned is probably due to the action of the alkalis upon the oil present. To determine if such was the case, a mixture of commercial oil of peppermint, with a 5 per cent. aqueous potash solution was made, repeatedly agitated and allowed to stand. It separated into two layers, and after several days the potassa layer assumed a brown color. An alcoholic solution of menthol, made to undergo the same treatment, is apparently not influenced in this manner. Perhaps this latter fact may be utilized

in the manufacture of the tablets, to prevent at least the color change. The other decomposition mentioned can hardly be prevented, as long as the volatile ammonium salt forms an ingredient of soda mint tablets.

[*Note by the Editor.*—Among the formulas published many years ago, we find the following :

Sodii bicarb., \mathfrak{z} iv; Spir. ammon. arom., \mathfrak{z} i; Aq. menth. pip., \mathfrak{z} xvi.—G. Norris, in Griffith's Medical Formulary.

Sodii bicarb., \mathfrak{z} ij; Spir. ammon. arom., gtt. xl; Aq. menth. pip., \mathfrak{z} vii.—Amer. Jour. Phar., 1869, p. 90, from Ellis' Med. Formulary.

Sodii bicarb., \mathfrak{z} ss; Aq. menthæ, \mathfrak{z} iv.—Dr. E. Wilson, in Parrish's Practical Pharmacy, 1859.]

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

Creasote pills containing ten or more per cent. of creasote may be made by a modification of Dieterich's method, as follows: Creasote 10 parts, glycerin 1 part, extract of liquorice 10 parts and powdered liquorice root 19 parts.—Gerber, *Schwz. Wochenschr. f. Chem. u. Pharm.*, 1892, 73.

Dermal prescriptions.—Among the remedies prescribed by Dr. Lassar, the following are quite frequently used: *Pasta salicylica* ("white paste"). Salicylic acid 2·0, zinc oxide, starch, of each 24·0, yellow vaselin 50·0. *Unguentum rubrum sulfur.* ("red ointment"). Mercuric sulphide 1·0, sublimed sulphur 25·0, yellow vaselin 74·0, oil of bergamot gtt. xxx. *Unguentum contra Perniones* ("frost ointment"). Carbolic acid 2·0, lead ointment, lanolin, of each 40·0, olive oil, 20 0, oil of lavender gtt. xxv. *Unguentum Diachylon carbolisatum* ("lead ointment"). Lead plaster, yellow vaselin, of each 50 0, carbolic acid 2·0. *Pasta oleosa zinci* ("zinc oil"). Zinc oxide 60 0, olive oil 40 0. *Linimentum picis* ("tar"). Beechwood tar, birchwood tar, of each 40·0, olive oil, dilute alcohol, of each 10·0; this preparation can be diluted with oil. *Pasta Naphtholi* ("scale paste"). β -Naphthol 10·0, precipitated sulphur 50·0, yellow vaselin, green soap, of each 20·0. *Pasta Resorcini mitis* ("mild resorcin paste"). Resorcin 10·0, zinc oxide, starch, of each 25 0, paraffin oil 40·0. *Pasta Resorcini fortior* ("stronger resorcin paste"). Resorcin, zinc oxide, starch, of each 20·0, paraffin oil 40·0. *Pulv. dentifric. sapon.* ("tooth

powder"). Precipitated carbonate of calcium 100.0, potassium chlorate, powdered pumice stone, of each 2.5, medicinal soap 25.0, oil of peppermint 1.0.—*Apotheker Zeitung*, 1892, 105.

Di-iodo-thiophene is proposed by E. Spiegler as a substitute for iodoform; it has been found effective in preventing pus-formations. It has the formula $C_4H_2I_2S$ and contains 75.5 per cent. iodine and 9.5 per cent. sulphur directly in combination with carbon; it forms tabular crystals, easily volatilized, melting point $40.5^\circ C$. The odor is stated to be rather aromatic; it is insoluble in water, slightly soluble in cold alcohol, but easily soluble in warm alcohol, ether and chloroform. A ten per cent. gauze is made by saturating gauze with the following solution: Di-iodo-thiophene 50.0, alcohol and ether, of each 500.0, glycerin 10.0; an addition of 2.0–3.0 of a saturated, alcoholic solution of saffranine is recommended to indicate the uniform distribution of the solution upon the gauze.

Sodium thiophene-sulphonate.— $C_4H_3SN_2SO_3$ is superior to naphthol in prurigo if applied in the form of a five to ten per cent. ointment (lanolin and vaselin equal parts as the base). This compound is a white crystalline powder containing 33 per cent. sulphur of which one half is directly combined with carbon. The lead salt can be used in the same manner, but it will cause a burning sensation lasting for several minutes with some individuals.—(*Therap. Monatshefte*) *Pharm. Ztg.*, 1892, 106.

Nitrous acid as a disinfectant had been proposed some years ago because of its peculiar property of being an oxidizing as well as a reducing agent; H. Bornträger employs the following combination containing 20 per cent. sodium nitrite: One part sodium nitrite and one part gypsum are melted together, after cooling the mass is powdered and preserved in well-stoppered receptacles. Two parts sodium bisulphate and one part gypsum are also melted together and, after cooling, powdered. Both powders are now mixed and preserved in dry and tightly-stoppered containers. If this powder be thrown into water or substances to be disinfected, a uniform evolution of nitrous acid takes place which rapidly destroys foul odors.—*Pharm. Centralhalle*, 1892, 117.

Kola-nut.—An analysis by Heckel and Schlagdenhauffen was published in the American Journal of Pharmacy, 1884, page 170. It was at first thought that the medicinal effect depended entirely upon the presence of caffeine, although Heckel found that the residue

after extracting with chloroform still had considerable action, and that the red coloring matter by heating gave a sublimate of caffeine which it was thought was prevented from being extracted by some resinous matter. Dr. E. Knebel in taking up this subject finds that the red coloring matter contains a glucoside for which the name *Kolanin* is proposed, and which by heating with water or dilute acid decomposes into caffeine, glucose and Kola-red; it therefore follows that in the above analysis only the free caffeine was determined, whilst that present in combination was put down along with the coloring matter. It is very probable that the unripe or ripe seed contains only the glucoside, which by ripening or drying is decomposed largely into the several constituents by a ferment, which was isolated and found to have diastasic action upon starch; the fresh seed not being obtainable this could not be verified by an examination, but attention is called to the almost molecular proportions in which the caffeine and glucose are found in the dry seed; African explorers have repeatedly stated that the fresh seed upon mastication has at first a bitter taste soon changing to sweet. *Kola-red* free from glucoside was prepared and by analysis was found to have the formula $C_{14}H_{13}(OH)_5$; it is very unstable and very probably by oxidation forms the tannic acid found in the seed.—*Apotheker Ztg.*, 1892, 112.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

Vesication with mercury.—Dr. Aubert (*Lyon méd.* through *L'Union pharm.*, 1892, p. 55) uses corrosive sublimate as a vesicant with good results. He uses a compress moistened with a 1 per cent. solution of this salt, and in 6 to 7 hours obtains a vesication analogous to that from cantharides. The phlyctæna is limited by the outline of the compress, and judging from the experiment, which should be controlled, the serum is aseptic. The manner of applying is as follows: A layer of diachylon plaster is placed next to the skin, leaving an opening of sufficient size in the centre, on this is applied the compress, following it with oiled silk, cotton and a bandage.

Strontium salts as tæniifuges.—Dr. Laborde (*Rép. de Pharm.*, 1892, 85) uses the following prescription in cases of tænia: Stron-

tium lactate 20 gm., distilled water 120 gm., glycerin 30 gm. The dose being two tablespoonfuls a day for five days, at the end of which time the tænia has usually been passed off.

Toxicity of barium salts.—Dr. Bardet (*Société de Thérap.*, December 9, 1891; *Rép. de Pharm.*, 1892, 35) experimented on rabbits with barium chloride. He gave the same by the stomach and by hypodermic injections. The poisonous dose by the stomach amounts to 10 centigm. pro kilogram of animal; they can, however, after some time take 7 cgm. pro $\frac{1}{2}$ kilogm. without inconvenience; hypodermically, these animals resisted doses of 6 cgm. per kilogm. From these experiments the author draws the conclusion that the barium salts are not as poisonous as has been accepted, and that strontium salts which are contaminated by traces of barium salts are unable to produce toxic effects in man.

Toxic effects of boric acid.—Dr. Lemoine (*Monit. Pharm.*, January, 1892, 1019) states that boric acid is not such a harmless antiseptic as has generally been accepted, as it may cause rubeolous eruptions, accompanied by vomiting, constant nausea, intense cephalalgia and sleeplessness without an accompaniment of rise in temperature or acceleration of the pulse. Furthermore, a general urticaria, with vomiting and quiet delirium, were noticed.

Sensitive test paper.—Neutral white filter paper is immersed in tincture of curcuma (1 to 7) and permitted to dry. Each leaf is then treated separately with a 2 per cent. solution of potassium hydrate, and then rapidly washed in pure water. The paper is then dried and preserved in tinfoil; this is necessary as it is altered in contact with air. The sensitiveness of the paper is shown by its coloring in a solution of hydrochloric acid (1–150,000) and also by its change in color in a solution of carbonic acid. The test paper is used in the same manner as litmus paper.—(*Bollet. farm.*, 1891, 721, through *Rép. de Pharm.*, 1892, 28.)

Analysis of commercial starches.—A. Baudry (*“La Pomme de terre industrielle,”* through *L'Union Pharm.*, 1892, 63) proposes an analysis based on the following facts: (1) Salicylic and benzoic acids completely dissolve starch on heating; (2) the soluble starch is dextrorotary; (3) the deviation is proportional to the amount of dissolved starch for the same length of tube. The manner of applying this method is the following: 3.321 gm. starch, to be analyzed, is

placed with 80–90 cc. water in a flask of 200 cc. contents. To this is added .5 gm. salicylic acid, the whole boiled from 20–25 minutes, then sufficient cold water is added to make about 190 cc., and the contents are then cooled. Lastly 1 cc. ammonia is added, the quantity made up to 200 cc., shaken and filtered. The liquid is examined in a 400 mm. tube, giving the amount of anhydrous starch in the sample, if a saccharimeter is used whose 100 division correspond to 10 gm. saccharose (Vivian). If a Laurent saccharimeter is used where the divisions correspond to 16.198 saccharose, only 2.688 gm. of starch are to be employed. In this case the number of degrees observed multiplied by 2 gives the percentage. For determining the quantity of impurities it is only necessary to filter the soluble starch through two equipoised filters, one placed within the other, and then washing the residue with boiling water until the filtrate gives no reaction with ferric chloride. The filters are then dried and weighed.

Santoninoxime as an *anthelmintic* is recommended by Coppola (*Union méd.*) who regards it as a safe and reliable substitute for santonin, requiring doses about three times as large as those of the latter, the administration, however, not being followed by unpleasant effects.

Santoninoxime, $C_{15}H_{19}NO_3$, was first prepared in 1889, by P. Guici (*Gazz. chim.* xix, 367) by digesting near $80^{\circ}C$, for 3 or 4 days 5 p. santonin, 4 p. hydroxylamine hydrochloride, 50 p. strong alcohol and 4 p. precipitated calcium carbonate. It crystallizes in white silky needles, melts at about $217^{\circ}C$., is very slightly soluble in hot water, and turns polarized light to the left, $[a]_D = -80.83$.

Ephedra vulgaris is esteemed in Russia as a popular anti-rheumatic remedy. Dr. Betchine of St. Petersburg (*Lyon médicale*) has found the bark and the root quite efficacious in acute articular rheumatism with high fever, but in chronic rheumatism not accompanied by fever only temporary relief could be observed. See also *Am. Jour. Phar.*, 1884, p. 540; 1890, pp. 339, 397.

Value of Cinchonas cultivated at Reunion.—The French government has been making experiments with the cultivation of cinchonas at Reunion. Analyses of these barks made by Houdas show that they contain but 4.32 per cent. of total alkaloids, 1.70 per cent. being quinine.—*Rép. de Pharm.* 1892, 90.

Assay of Coffee.—According to Herlant (*Monit. de la Pharm.*, Feb. 1892, 1028), the caffeine can be estimated in coffee, as follows: The finely powdered coffee is mixed with slaked lime, and this mixture extracted with a 5 per cent. solution of sodium benzoate which dissolves the caffeine. The liquid is made alkaline with sodium carbonate and filtered. The filtrate is then extracted with a sufficient quantity of chloroform, which on evaporation yields the caffeine in the form of white silky crystals.

Natural oil of bitter almond.—For distinguishing an artificial from a natural oil it is proposed by Wender to heat the oil with 1 cc. of a mixture of equal parts of alcohol and sulphuric acid and two drops of an aqueous solution ($\frac{1}{2}$ per cent.) of furfurol. The natural oil gives a brownish violet color increasing in intensity for 24 hours. The artificial oil assumes a rose color, gradually changing to pure violet. Unfortunately mixtures of the two oils cannot be distinguished by this reaction.—*Boll. farm.*, Nov, 1891, 680, through *Journ. de Pharm. d'Anvers*, 1892, 23.

Erythrophlœine.—The alkaloid of *Erythrophlœum guineense*, according to Prof. Sée, (*La Méd. moderne*), is about as poisonous as the amorphous digitalin of Homolle and Quevenne, and acts both upon the heart and lungs. The hydrochloride crystallizes and is soluble in water. The medicinal dose, 1.5 to 2.5 mgm. ($\frac{1}{40}$ to $\frac{1}{25}$ grain), does not produce any digestive disturbance, and modifies but slightly the condition of the heart, but renders respiration more easy.

Camphorated Salol has been used with favorable results by Dr. Pégon (*Rev. Thérap.*) in suppuration of the ear. It is prepared by fusing at a moderate heat equal parts of salol and camphor, filtering if necessary, and preserving the product in a yellow well-stoppered glass bottle. At ordinary temperatures it forms a thick colorless liquid, which is decomposed on exposure to light or air, is insoluble in water, but dissolves in ether, chloroform or oil. It is applied by means of a small pledget of cotton. See also *Amer. Jour. Phar.*, 1889, p. 136, and 1891, p. 54.

Decomposition of iodoform in collodion.—Etiévant ascertained (*Rép. de Phar.*, Jan. 10, 1892) that 50 gm. of a freshly prepared 10 per cent. solution of iodoform in collodion, exposed to the sunlight, after 24 hours may contain 0.40 gm. free iodine, while the amount

of iodine liberated in the dark was only 0.06 gm. The decomposition is retarded by keeping the solution in yellow glass bottles, which are preferable to blue glass. The decomposition is increased by a rise of temperature. In neutral solutions the decomposition of iodoform is very slight, but it is hastened on by the addition of acids. In making *iodoform collodion* it is, therefore, important that the vehicle be of neutral reaction, and that the preparation be kept in well-stoppered yellow glass bottles, in a cool place, and exposed to the light as little as possible.

Guaicol biniodide, a new aristol.—Dr. Vicario (*Prog. Thérap.*, January, 1892) proposes guaicol biniodide as a probable pulmonary antiseptic. It is prepared from guaicol sodium by the action of iodine in potassium iodide solution. The guaicol is treated with an excess of caustic soda, which produces a whitish mass gradually becoming greenish and violet. The guaicol sodium is obtained in a pure and crystalline state by recrystallization from guaicol. The guaicol can be recovered by distillation. The crystalline compound is dissolved in water and to this is added a solution of iodine in potassium iodide as long as precipitation takes place. The precipitate is of a reddish brown color possessing the odor of iodine, readily decomposable on heating, fusible on a water bath and soluble in alcohol and fixed oils.

Valuation of creasote.—E. Merklen (*L'Union pharm.*, 1892, 5) gives easily applied tests for the valuation of beech wood creasote. (1) *Water*, of which it can take up 9 per cent. Ten cc. creasote are heated with about 2 gm. calcium chloride in a test tube until the salt melts. The two are then well mixed and set aside to cool. In case water is present the calcium chloride remains liquid. Anhydrous copper sulphate could be used for the same purpose, the white salt becoming blue in presence of water. (2) *Phenol*. The well-known tests of collodion and perchloride of iron are of no use in case a mixture of phenol and creasote is to be examined. The best test is that proposed by Flückiger. Four cc. creasote and 1 cc. ammonia are heated to 60° C. (150° F.), well mixed and poured into a large capsule. This is then tilted from side to side so as to make the liquid cover as large a surface as possible. A small vial of bromine is then inclined toward the centre of the capsule, so that the vapor can readily come in contact with the liquid. Where

the vapor of bromine acts on phenol or carbolic acid a deep blue color appears in place of the brown color turning to green, which is due to pure creasote. (3) *Guaiacol*. Although it is not proven that guaiacol is the only remedial agent contained in beech wood creasote, it is present in large quantity and should only traces be found, it can easily be supposed that the guaiacol has been separated. In mixing 5 cc. creasote with 50 cc. of a 20 per cent. alcoholic solution of potassium hydrate, the liquid assumes, in from ten to thirty minutes, a crystalline state due to a combination of creasol and guaiacol with potassium. The crystalline mass is pressed between filter paper until perfectly dry and put into a test tube with 5 cc. sulphuric acid diluted to 1-10. The mixture is heated for a moment when the creasol and guaiacol rise to the top of the liquid. The aqueous liquid is then sufficiently diluted to allow the oils to sink to the bottom when it is decanted, and is replaced by 4 cc. of concentrated ammonia. This forms a hard crystalline compound with guaiacol while the creasol after some time forms a semi-solid crystalline mass. On treating the mass with benzin everything goes into solution but the ammonia compound of guaiacol.

Creasote should have a specific gravity of 1.080, should remain limpid with dilute sodium hydrate and should not redden blue litmus paper.

Synthetic paracresylol is recommended by Choay (*Rép. de Phar.* Jan. 10, 1892) in place of the numerous compounds and mixtures of impure cresylols which have recently been introduced. It is insoluble in water, but dissolves in alcohol, glycerin, and in soap solutions. One part of soap will form with 2 parts of paracresylol a perfect solution in water. Such solutions are neutral and contain the active agent in the free state, so that it may be completely removed by agitation with ether.

ITALIAN YELLOW WAXES.¹

BY STEFANO CAMILLA.

The investigation was conducted in the laboratory of Prof. Guareschi, at Turin. After detailing the recorded results of others in the analysis and the examination of beeswax, the author describes

¹ Sulla cera gialla delle api. Contributo allo studio della cera gialla italiana. Tesi de Laurea in Chimica e Farmacia.—Abstract prepared by Jos. W. England, Ph.G.

his own investigations which were made with eleven samples of wax from different parts of Italy.

The specific gravities were determined with the picnometer of Unger¹, and the results corrected to temperature at $+4^{\circ}$. One specimen gave 0.966, and another 0.964, while the remaining nine ranged from 0.959–0.961. Dieterich and Rüdorf have found the specific gravity of yellow wax to be 0.973. The present German Pharmacopœia gives 0.962–0.966; the preceding edition 0.955–0.966; the Russian Pharmacopœia 0.960, the Danish 0.960–0.970, and the Netherland as 0.968–0.970. The author claims that the Unger picnometer is much superior to the older method of using an alcoholic and ammoniacal solution.

The melting points in the Italian waxes varied from 62.5° to 63.5° , and from 63.3° to 64.4° . The point of solidification was from 0.5° to 1° less than the point of fusion. The fusing point is stated by the German Pharmacopœia to be from 63° – 64° ; by Schödler, 62° – 62.5° ; by Payen, 61.5° – 62° ; by the British Pharmacopœia, 60° ; by the Austrian and Netherland, 60° – 62° ; by the Danish, 62° ; by the Russian 62° – 63° ; by the Swiss, 62° – 64° and by the Hungarian Pharmacopœia, 68° .

The acid numbers² were next determined by ascertaining the number of milligrams of KHO required to neutralize the free acids in one gram of the wax, of which the more important is cerotic acid; they are soluble in boiling alcohol. The following method was used: Introduce 2 to 4 grams of the wax into an Erlenmeyer flask with 30 cc. of alcohol (95 per cent.), slowly bring the contents to the boiling point, agitating briskly. To the alcoholic solution of the free acids a few drops of one per cent. alcoholic phenolphthalein solution are added as indicator, and a half normal alcoholic solution of KOH is used for estimation. According to Hehner, each milligram of KOH corresponds to 7.308 milligrams of cerotic acid. The data of Hübl show that for the saturation of the free acids in one gram of wax, there was required 19–21 mgm. of KOH. Hehner has found that English wax requires 20 mgm., Buisine placed it at 19–21 mgm., Mangold at 20 mgm.; in the Italian waxes, examined

¹ Beckurts' Jahresbericht, 1888, p. 145.

² For acid, ether and saponification numbers, see Amer. Jour. Phar., 1884, p. 480, and 1888, p. 561.

by the author, the greater number run from 19.04 to 20.03; those from Liguria from 20.67 to 21.22.

The ether number is represented by the milligrams of KOH required for the saturation of the acids present in combination in 1 gram of wax. The main acid is palmitic, combined with melissic alcohol, constituting myricin. For the determination of the ether number the mixture left from the previous acid determination is heated to boiling with 30 cc. of alcohol (95 per cent.) and 10 cc. of a normal alcoholic potash solution; and when saponification is complete, estimate excess of alkali with a half-normal solution of HCl; the difference for one gram of wax will give the ether number, which varies in the Italian waxes examined between 72.18 and 76.05. The ratio of acid and ether numbers is, therefore, 3.55 to 3.8; Hübl determined it between 3.6 and 3.8; Mangold between 2.89 and 4.02, and Buisine, 3.5 to 3.8. The total of KOH used for the free and combined acids gives the saponification number, which varies for the Italian waxes between 91.22 and 97.27 (to 96 for the greater number), while Becker found 97 to 107, Hübl 92 to 97, Buisine 91 to 97, and Mangold 88.26 to 99.9, in many cases less than 93.

In the estimation of the volatile acids, Reichert's method modified by Meissl was used as follows: Saponify 5 gm. of the wax with 1 gm. of KOH and 50 cc. of the purest alcohol; distil off the alcohol when reaction is complete, dissolve the residue in 100 cc. of distilled water, add 20 cc. of dilute sulphuric acid (1 : 10), and several pieces of pumice stone to facilitate ebullition, collect 100 cc. of distillate, and titrate this with $\frac{1}{10}$ normal soda. The number of cubic centimeters necessary for neutralization is the Meissl number, which, in the specimens examined, varied from 0.35-0.40; for two samples from Liguria it was 0.54 and 0.91.

The iodine number is the quantity of iodine absorbed by 100 grams of wax. The author does not agree with A. and P. Buisine that the iodine absorbed is due entirely to the presence of oleic acid and other non-saturated acids of the series $C_nH_{2n-2}O_2$, but he claims that a part of the iodine must go to the unsaturated hydrocarbons in the wax, which amount to about 2.86 per cent., and must also be influenced by the coloring and odorous matters present, and for these reasons he questions the value of the iodine number as an indication of the amount of oleic acid. A number of Italian waxes examined by the method of Hübl, showed the iodine number to

vary with the intensity of color. In white wax it was from 2 to 7; and in yellow wax from 8.18 to 11.06.

As possible adulterants are mentioned paraffin, Chinese wax, Japan wax, ozokerite, ceresin, vegetable waxes, carnauba wax, stearic acid, suet, resin, mineral and organic matter. Several specimens of adulterated wax were examined by the author; and for comparison with the results obtained with pure wax, Hübl's table of results with wax substitutes is quoted (see Amer. Jour. Phar., 1884, p. 480); also the results obtained at the central chemical laboratory of Rome in 1890, which are, in part, given in the annexed table:

	Fusing point.	ACID NUMBERS.			Iodine number.
		Acids soluble in water.	Free acids.	Total acids. (Saponification.)	
Japan wax,	47-54	2	18-28	216-222	6-7.55
China wax,	53.5	2	22	218	6.85
Vegetable wax,	47-54	2	17-19	218-220	6.6-8.2
Carnauba wax,	83-84	0	4-6	79-82	7-9
Mineral wax,	60-80	0	0	0	0.06
Paraffin,	38-74	0	0	0	17-31
Grease wax,	62-66	0	95-115	102-119	13-18.5
Suet,	42-50.5	0	275-5	196-213	27-40
Stearic acid,	55.5	0	204	209	4
Resin,	—	0	168	178	135.6
Yellow beeswax,	62-64	0-1	19-21	91-97	8-11
Bleached beeswax,	63-64	0-2	20-23	93-111	2-7

UNNA'S MEDICATED SKIN VARNISHES.

Skin varnish is the term applied by Unna to preparations used in dermatological practice for forming a thin covering on the skin. The principal bases for these preparations are the following:

Bassorin Varnish.—The pure bassorin basis is obtained, according to Elliot, by filtering tragacanth mucilage (15:100) in a filter heated by steam, evaporating and mixing with glycerin. A similar basis may be prepared by stirring five parts powdered salep with 95 parts cold water until a smooth mucilage is obtained, then heating for

half an hour on the steam-bath. The salep basis contains less bassorin but more starch.

Casein Varnish.—The casein obtained by coagulating skim-milk with rennet at a temperature of 35° to 40° , is washed and dried until it forms a yellowish-white sandy powder soluble in alkaline solutions. In preparing the casein varnish this casein is dissolved by means of borax. For 20 parts casein, 2.5 parts of borax and 77.5 parts water furnish a rapidly drying uniform covering material. The alkaline characters of the borax are marked by the casein. Admixtures of heavy pulverulent substances readily settle out of this basis and it is requisite to distribute them by shaking. A varnish of casein and glycerin is prepared by dissolving the casein in 3 or 3.5 parts of ammonia, adding a quantity of glycerin equal in weight to the casein, and heating to drive off the ammonia. The resulting mass mixed with twice its weight of boiling water gives an excellent permanent emulsion.

Amber Varnish is made by dissolving a mixture of amber and turpentine in alcohol. It must not be used as a vehicle for the application of zinc oxide.

Castor Oil and Shellac Varnish.—With 1 part shellac, $\frac{1}{5}$ part castor oil, and 3 parts alcohol, a varnish is obtained which forms a good flexible covering easily removed by alcohol.

Canada Balsam and Collodion Varnish.—Sixteen parts collodion with 1 part Canada balsam gives a material suitable for the application of pyrogallol, and it can be easily removed by alcohol.

Castor Oil and Collodion Varnish—Eight parts collodion and 1 part castor oil.

Lead Ricinoleate Varnish.—One part lead oxide heated with 1.5 part castor oil to saponification and mixed with 2 parts absolute alcohol, gives a good skin varnish.

Chrysarobin Amber Varnish.—One part chrysarobin and 20 parts of amber dissolved in turpentine.

Pyrogallol Shellac Varnish.—One part pyrogallol, 1 part castor-oil, 5 parts shellac and 15 parts absolute alcohol.

Salicylic Acid, Canada Balsam, and Collodion Varnish.—One part Canada balsam, 10 parts collodion and 3 parts salicylic acid.

Zinc Oxide, Castor Oil, and Collodion Varnish.—Two parts zinc oxide, 2 parts castor oil and 16 parts collodion.

Zinc and Lead Ricinoleate Varnish.—Five parts lead ricinoleate,

8 parts zinc oxide, 8 parts absolute alcohol, and lastly 1 part each of collodion and ether.

Ichthyol Borax Casein Varnish.—Five parts sodium ichthyolate and 15 parts borax casein varnish.

Sulphur Glycerin Casein Varnish.—Five parts sulphur and 15 parts glycerin and casein varnish.

Zinc Oxide Salepbassorin Varnish.—Two parts zinc oxide and 18 parts salepbassorin varnish.

Zinc Ichthyol Tragacanth Bassorin Varnish.—One part sodium ichthyolate, 2 parts zinc oxide, and 17 parts tragacanth bassorin varnish.—*Therapeut. Monatsch.*; *Phar. Jour. and Trans.*, March 5, 1892, p. 733.

COAGULATION OF THE BLOOD.¹

BY C. A. PEKELHARING.

Recently, a number of observations on the importance of calcium salts in the process of blood coagulation have been published.

Brücke first showed that the ash of fibrin always contains calcium. In 1875, Hammarsten found that calcium chloride can take the place of serum globulin in fibrin formation. In 1887, Green found that in magnesium sulphate plasma, and also in other forms of plasma, coagulation is hastened if small quantities of calcium sulphate are added in addition to fibrin ferment. Later, Ringer and Sainsbury found that this result can be brought about by other calcium salts, such as the chloride, and also, but not so readily, by means of soluble strontium and barium salts. Freund (*Med. Jahrb.*, 1888, 259) who also noted the hastening of coagulation by calcium salts, considered that the blood corpuscles, as soon as the blood is shed, yield alkaline phosphates to the plasma; meeting with the calcium salts there, tricalcium phosphate is precipitated, and herein lies the cause of fibrin formation. Latschenberger (*Med. Jahrb.*, 1888, 479), and von Strauch (*Dissert. Dorpat*, 1889) showed certain fallacies in this hypothesis; thus the addition of alkaline phosphates and calcium salts resulting in the precipitation of tricalcium phosphate does not always lead to the formation of fibrin in fibrinogenous liquids; also the first portions of fibrin formed were found

¹ *Virchow's Festschrift*, 1891, Bd. 1; *Jour. Chem. Soc.*, 1892, p. 87.

to contain calcium, but no phosphoric acid, and further, in the present research, it is shown that injection of disodium phosphate into the circulation of a living animal is not followed by thrombosis.

Arthus and Pagés (*Arch. de Physiol.*, 1890, No. 4) found that blood coagulation may be entirely prevented if, immediately on being shed, the blood is mixed with small quantities of substances, like oxalates or fluorides, which precipitate calcium salts as very insoluble compounds. On adding to the plasma obtained from this blood a slight excess of calcium chloride, coagulation immediately ensues. Fibrin ferment is, however, essential for the process; and the action of this agent is considered to be the bringing together of fibrinogen and the calcium compound, and thus the formation of fibrin. In this, they draw a close analogy between fibrin formation and the formation of casein in milk under the influence of the rennet ferment. Green attempted to answer the question: Does the fibrin ferment exist as zymogene in the plasma, and is such zymogene converted into the ferment by the action of the calcium salt? He was unable to find a positive answer; and therefore considered that the calcium acts in assisting the ferment much as hydrochloric acid in the gastric juice favors the activity of pepsin. This question is again taken up in the present investigation, and it was found possible to prepare from plasma (such as oxalate plasma which contains no ferment) a globulin which has no fibrinoplastic properties, which, however, after contact with calcium chloride, is converted into the ferment. The zymogene yields an ash containing little or no calcium, whilst the ferment is rich in calcium. The material in question arises from the formed elements of the blood, and is identical with what is called cell-globulin by Halliburton.

Fibrin, moreover, is a calcium compound, and the main action of the ferment appears to be to transfer the calcium to the fibrinogen.

Granting this hypothesis, it is possible to explain several facts hitherto but little understood in connection with blood coagulation, and to reconcile certain conflicting theories. The action of oxalates in hindering coagulation is explained on the supposition that the precipitate of calcium oxalate, on account of its insolubility, is not available for the conversion of zymogene into ferment. The action of neutral salts in restraining clotting is explained on the assumption that the ferment is a globulin, and although the amount of salt

added is not sufficient to precipitate the globulin, yet it is sufficient to lessen those intramolecular movements which, in the end, produce its specific action.

The action of peptone in hindering coagulation can be explained by the affinity between peptone and calcium compounds. It thus prevents these from converting the zymogene into the ferment. This view is supported by the fact that other substances, like soaps, which combine with calcium compounds, produce similar symptoms to those set up by peptone (Munk). Thus, there is a loss of coagulability of the blood, low blood pressure, suppression of secretions, and even death. The toxic effects appear to be due to the removal of calcium salts, which are necessary, as Ringer has shown, for all vital processes. A further support to the theory is obtained from the fact that injection into the circulation of calcium chloride simultaneously with the peptone, or after the peptone, obviates the poisonous effects of the latter; peptone is then no longer capable of rendering the blood uncoagulable. Peptone also restrains coagulation in intravascular plasma (or solutions of Hammarsten's fibrinogen), provided that it is added so rapidly that the zymogene has not had time to combine with the calcium to form the ferment. After the ferment has been once formed in the plasma, or added to the solution of fibrinogen, peptone has no longer any hindering influence on coagulation.

Wooldridge's tissue fibrinogens appear to consist of proteid nucleïn and lecithin. They contain no fibrin ferment until they have been digested for some time with a little calcium chloride; it is, therefore, considered that they contain the zymogene of fibrin ferment, and their action in producing intravascular coagulation is explicable on the theory that, in the blood, they come into contact with calcium compounds, so that the zymogene is then converted into the ferment.

ARTIFICIAL HUMAN MILK.

BY T. MALTBY CLAGUE, Pharmaceutical Chemist.

During the last four years experiments have been made at intervals, the record of which will be of sufficient interest to pharmacists to warrant publication.

Attention was first given to the subject through the request of a medical practitioner, who desired to obtain a supply of food for

young infants which should as nearly as practicable resemble the mother's supply, when that supply was deficient or absent.

The literature on the subject was principally found in an article by Professor Frankland ("Experimental Researches," London, 1877, p. 843). Here the percentage composition of human and cow's milk was given as follows :

TABLE I.

	<i>Woman.</i>	<i>Cow.</i>
Casein,	2.7	4.2
Butter,	3.5	3.8
Milk-sugar,	5.0	3.8
Salts, . . . . .	.2	.7

A glance at this table will show that the assimilation of the two required that the quantity of casein present in cow's milk should be decreased, while the quantity of butter was maintained, and that of milk-sugar should be increased.

In the case of the addition of milk-sugar the increase was easy, as a supply of that constituent was easily obtained to augment that which was already in the natural compound. But the subtraction of the casein was not so simple a matter. He proposed, however, to accomplish this, to remove one-third of the casein from cow's milk, and to keep the butter strength as it was, thus giving a liquid having a composition per cent. of :

TABLE II.

	<i>Per Cent.</i>
Casein,	2.8
Butter,	3.8
Milk-sugar,	5.0
Salts, . . . . .	.7

The mode of preparation was to remove the cream from one-third of a pint of new milk and by means of rennet to curdle the skimmed milk; the separated whey had then 110 grains of milk-sugar dissolved in it, the solution being added to the remaining two-thirds of a pint of new milk and the cream which had been removed as above.

Although very good results could be obtained by this process, it had the disadvantage of being wasteful and tedious. A simpler mode of working was therefore thought out and the following plan was adopted.

Water was used in the place of the whey, and extra cream sepa-

rately purchased was used to supply the required extra butter. Milk-sugar was separately added, the working formula being :

TABLE III.

	Oz.
New milk,	30
Cream,	1 $\frac{3}{4}$
Milk-sugar,	1 $\frac{1}{8}$
Water,	18

Fortunately, a large and well managed dairy in the neighborhood supplied a cream which repeated analysis showed to be very uniform in composition, and so made it an easy matter to build up a product which should approximate very closely to its theoretical contents:

TABLE IV.

Casein,	2'7
Butter,	3'8
Milk-sugar,	5'0
Salts,	'4

A comparison of the last table with the first will show that results are obtained more closely in accord with the human milk than by the mode advocated by Professor Frankland, while the process is simpler and more economical.

The prominence given in recent years to the supremely important question of sterilization was next taken into account ; the object being to avoid the possibility of communicating disease, and also to present the food free from germs of decomposition, which might be developed after its ingestion and cause dyspepsia.

The method advocated by Professor Soxhlet, and published in the *Pharmaceutical Journal*, 3d series, vol. xvii, p. 573, was adopted with slight modifications. The expense of rubber corks stood in the way of their use, but ordinary corks presented many difficulties in the obtaining of a perfect hermetical sealing. Chief among these difficulties was the fact that cork compressed while hot and wet into the neck of a bottle, did not retain its elasticity sufficiently to remain air-tight. It was found feasible to produce results which would remain good for a week or so ; it was much more difficult to secure its keeping for longer periods. Samples have, however, been manipulated, which remained sweet and good for over two years.

Several children were put upon this food, as made in our laboratory, and the results were of a most satisfactory character ; the tes-

timony of parents and medical attendants being that the children were able to retain and assimilate the food, who could not retain or assimilate any other milk food; while the development of the children was steady and gratifying. The profit obtainable was not, however, sufficient to compensate for the trouble involved, and a simple receipt for its manufacture was given to several parents, who have been able, with the implements and intelligence contained in their kitchens, to produce satisfactory results. This was: New milk, 3 pints; cream, 4 ounces; milk-sugar, $3\frac{1}{4}$ ounces; water, 2 pints. Dissolve the milk-sugar in the water and mix all together. Put into bottles filled to shoulder only, place them on the tray of a fish kettle, surround with water and place on the fire. Allow the water to boil for half an hour, so that the expansion of the milk may be fairly complete; then cork and allow the boiling to continue for another half-hour, when the operation is complete.

A sample of the kitchen-prepared article has been submitted to analysis with the following results:

Casein,	2.6
Butter,	3.4
Milk-sugar,	4.8
Ash, . . . . .	.4
Water,	88.1

A comparison of the digestibility of the three milks, that is the artificial human, the natural supply and cow's milk, has also been attempted. A sample of each was submitted to the action of rennet. In the case of the cow's milk the curd consisted of one large clot, while in the other two it was much broken up. To each a few minims of acid glycerin of pepsin was added, and they were placed in a water-bath at 140° F. for half an hour. Solution was almost complete in the case of the human and the artificial, while the cow's milk was far behind in the apparent solution.—*Phar. Jour. and Trans.*, Feb. 13, 1892, p. 651. See also paper on the same subject by Geo. Smith, F.C.S., in *Amer. Jour. Phar.*, 1889, page 424.

Large dose of paraldehyde.—Dr. Mackenzie (*Brit. Med. Jour.*, Dec. 12, 1891) reports the case of a lady patient who took by mistake $3\frac{1}{2}$ oz. paraldehyde. She became unconscious; after thirty hours showed signs of returning consciousness; after 34 hours opened her eyes; after 41 hours could understand and reply to a simple question. Strychnine and ammonia, also Faradic electricity were used as remedies.

ON THE ALKALOIDS OF TRUE ACONITUM NAPELLUS.¹

BY PROFESSOR DUNSTAN AND MR. JOHN C. UMNEY.

From the Research Laboratory of the Pharmaceutical Society.

The authors have examined the alkaloidal constituents contained in the roots of the true *Aconitum Napellus*. The plants were grown by Mr. E. M. Holmes, at the instance of the British Pharmaceutical Conference. The process used for the extraction of the alkaloids was such as to preclude the possibility of the occurrence of hydrolysis or other decomposition of the alkaloids. It consisted in percolating the roots, dried at a low temperature and finely powdered, with cold rectified fusel oil (b. p. 100°–132°) and extracting the alkaloids from the solution by agitation with water acidified with one per cent. of sulphuric acid. Resin was removed by extracting the acid solution with chloroform, and the liquid was then made just alkaline with dilute ammonia and extracted with ether, which removed a considerable quantity of alkaloid but left in solution a further and smaller quantity, which was subsequently dissolved out by agitation with chloroform.

The *alkaloid soluble in ether* was obtained as a gum-like mass incapable of crystallization. By conversion into hydrobromide it was separated into a crystallizable and uncrystallizable salt.

The crystalline hydrobromide was identified as the salt of aconitine, the crystalline and highly toxic alkaloid already described by one of the authors and Dr. W. H. Ince. The rotatory power of the pure hydrobromide in aqueous solution was ascertained to be $[\alpha]_D - 29.65$, a result which agrees well with that recorded in the paper above referred to. As some doubt exists with reference to the solubility of aconitine in water, it was carefully determined with this pure specimen. The mean of two determinations was 1 gramme in 4,431 grammes of water at 22°. Jürgens had previously recorded the far greater solubility of 1 in 745 at the same temperature.

The non-crystalline hydrobromide furnished an alkaloid resembling a gum in appearance. It dissolved in ether and alcohol, but only sparingly in water. The aqueous solution was alkaline to litmus and was very bitter, but it did not give rise to the tingling

¹ The substance of a paper communicated to the Chemical Society, on March 3, 1892; reprinted from *Phar. Jour. and Trans.*, March 5, p. 729.

sensation so characteristic of aconitine. The base could not be crystallized, neither could the hydrochloride, sulphate and nitrate prepared from it. The aurochloride is also amorphous. Owing to the circumstance that a crystalline compound of this base could not be obtained, it was difficult to gain conclusive evidence of its homogeneity.

The properties recorded above show that it is not aconine or the base called by Wright and Luff picra-aconitine, which readily afforded crystalline salts. These characteristic properties belong to an alkaloid of which a full account will be given in a later paper, considerable progress having already been made in the most difficult task of isolating it in a pure state. We propose to assign to it the name of *napelline*, which was first given to the alkaloid now known as pseudaconitine, and afterwards by Hübschmann to a substance which the work of Wright and Luff showed to be a mixture chiefly composed of aconine. The napelline obtained as described above is probably associated with another amorphous base, about which we have at present little information to give, beyond the fact that neither it nor its salts appear to crystallize.

The *alkaloid soluble in chloroform* was proved to be identical with *aconine*, the amorphous base which results from the hydrolysis of aconitine. On combustion it afforded numbers corresponding with those deduced from the formula $C_{26}H_{41}NO_{11}$. Its molecular weight determined by Raoult's method also corresponded with this formula.

The roots of the true *Aconitum Napellus* certainly contain three alkaloids, one of which is crystalline, viz.: aconitine; two being amorphous, viz.: napelline and aconine. Indications have been obtained of the presence of a fourth alkaloid which is amorphous and closely resembles napelline.

The authors found that the juice expressed from the roots contained a large proportion of amorphous bases but very little aconitine, the greater part of which remains in the root and may be extracted, together with the remainder of the amorphous alkaloids, by exhausting with amyl alcohol. The total quantity of amorphous bases amounted to more than twice that of aconitine.

The physiological action of all these alkaloids is being investigated. The results so far obtained point to the conclusion that crystalline aconitine is by far the most toxic of the alkaloids contained in *Aconitum Napellus*.

ON THE FORMATION AND PROPERTIES OF ACONINE AND ITS CONVERSION INTO ACONITINE.¹

BY PROFESSOR DUNSTAN AND DR. F. W. PASSMORE.

From the Research Laboratory of the Pharmaceutical Society.

Owing to the uncertainty which exists with reference to the products of the hydrolysis of aconitine, the authors have investigated the subject, starting with a pure alkaloid. Wright and Luff have stated that when aconitine undergoes hydrolysis the sole products are aconine and benzoic acid. More recently Dragendorff and Jürgens have asserted that the hydrolysis occurs in two stages. In the first stage there are formed benzoic acid and an alkaloid identical with the picraconitine once isolated by Wright and Luff from the roots of supposed *Aconitum Napellus*. In the second stage the picraconitine is hydrolyzed into benzoic acid, methyl alcohol and aconine, which is the final product of the change.

The authors have carefully studied the process of hydrolysis by heating pure aconitine with water in closed tubes at 150°, but have been unable to obtain at any stage either picraconitine or methyl alcohol. The alkaloid extracted from the solution by ether was a mixture of aconine with unaltered aconitine. With pure aconitine the reaction occurs precisely in accordance with the equation

$$C_{33}H_{45}NO_{12} + H_2O = C_{26}H_{41}NO_{11} + C_7H_6O_2$$

Having accumulated in these experiments a few grains of aconine, the authors proceeded to examine its properties when in a pure state. Up to the present time neither it nor its salts have been obtained in a crystalline state. The base, even when quite pure, cannot apparently be crystallized; all attempts to induce crystallization having failed. The authors have, however, succeeded in crystallizing several of the salts, viz.: the hydrochloride, hydrobromide, sulphate and nitrate. All these salts are very soluble in water; the hydrochloride being the least soluble is the easiest to crystallize. This salt is best purified by crystallization from a mixture of alcohol and ether. When dried at 100° it melts at 175.5° (corr.). The crystals deposited from alcohol have the composition $C_{26}H_{41}NO_{11}, HCl, 2H_2O$. When dried at 100°, they still retain 1 H_2O , which is, however, lost at 120°. The aqueous solution is lævo-

¹ The substance of a paper communicated to the Chemical Society on March 3, 1892; reprinted from *Phar. Jour. and Trans.*, March 5, p. 729.

rotatory $[\alpha]_D - 7.71^\circ$. The base was obtained from the pure hydrochloride by decomposition with a solution of silver sulphate, and decomposition of the aconine sulphate, with exactly sufficient baryta water. The solution on evaporation furnished a hygroscopic, brittle gum, which refused to crystallize. It melts at 132° (corr.). Aconine is very soluble in water, and the aqueous solution is alkaline. When dry it is insoluble in ether and almost insoluble in chloroform. On analysis it afforded numbers agreeing with the formula $C_{26}H_{41}NO_{11}$, which is that suggested by Dunstan and Ince as a result of their study of pure aconitine. Aconine is a powerful reducing agent, precipitating the metals from solutions of gold and silver salts. It also reduces Fehling's solution. By the reaction of auric chloride with a solution of aconine hydrochloride, an amorphous aurochloride is obtained which is considerably more soluble in water than the corresponding aconitine salt. The physiological action of pure aconine is being investigated. Its aqueous solution is slightly bitter, and gives rise to a burning sensation in the mouth, but does not produce the tingling which is characteristic of aconitine. In respect of its action on polarized light, aconine exhibits the same peculiarity as aconitine. Its salts are lævo-rotatory, whilst a solution of the free base is dextro-rotatory $[\alpha]_D + 23^\circ$. When heated with alkalis aconine slowly resinifies.

The study of the hydrolysis of aconitine has led to the conclusion that aconitine is monobenzoyl aconine ($C_{26}H_{40}(C_6H_5CO)NO_{11}$). In order to substantiate this inference from the analytical results and prove that aconine really stands in this simple relation to aconitine, experiments were made with a view of reversing the hydrolysis and reconverting aconine into aconitine. The action of benzoic anhydride on aconine at different temperatures led to no result, not a trace of aconitine or anhydro-aconitine being formed. Since aconine is a comparatively strong base, it seemed likely that it might be competent to decompose ethyl benzoate with formation of aconitine, or anhydro-aconitine if the temperature of reaction were high, according to the equations (1) $C_{26}H_{41}NO_{11} + C_6H_5CO \cdot OC_2H_5 = C_{26}H_{40}(C_6H_5CO)NO_{11} + C_2H_5OH$. (2) $C_{33}H_{45}NO_{12} = H_2O + C_{33}H_{43}NO_{11}$. Aconine was dissolved in alcohol, the alcoholic solution mixed with rather more than the calculated quantity of the alkyl salt, and the mixture heated in a closed tube for three hours at 130° . After removal of the unaltered ethyl benzoate, etc., a base soluble

in ether was isolated, and this furnished a crystalline hydrobromide which corresponded with the salt of anhydro-aconitine. The aurochloride melted at 141° , and is thus proved to be anhydro-aconitine aurochloride. The alkaloid produced the physiological action characteristic of anhydro-aconitine ($C_{33}H_{43}NO_{11}$), and was identical with that obtained by the dehydration of aconitine. Since the anhydro-compound combines with water to form aconitine, this result constitutes a partial synthesis of the natural alkaloid, and proves it to be monobenzoyl aconine.

The examination of the action of various reagents on aconine has, so far, not led to any important results. Nitrous acid fails to attack it. The principal product of its oxidation by alkaline permanganate is oxalic acid. Attempts to isolate an addition compound with methyl iodide were not successful. By the action of methyl iodide on aconitine, a crystalline *aconitine methyl iodide* ($C_{33}H_{45}NO_{12}, CH_3I$) was obtained which melts at 219° (corr.). The *aconitine methyl hydroxide* ($C_{33}H_{45}NO_{12}CH_3OH$) prepared from this compound is an amorphous base whose salts do not appear to crystallize. A further study will be made of this compound and its physiological action will be investigated.

ON THE FLORA OF NORTHERN OHIO.

BY EDO CLAASSEN.

[Concluded from p. 170.]

Not many days was the botanist at home, when he happened to read in the "Geological Survey of Ohio" communications in regard to the presence of lakes and ponds in the interior of the State not far from his residence, as well as notes on very rare and remarkable plants growing in and along them. At this point his eyes flashed, and, the weather being fair, he started early the next day to explore also these renowned localities. Swamps and peatbogs often border these lakes and ponds; those nearest to Cuyahoga County are: (1) Strutton Pond, Geauga and Crystal Lakes; (2) Silver, Congress, Cottage Grove and Chippewa Lakes, and (3) the Twin Lakes, Lake Pepin and Brady's Lake, of which those under (1) have on their border partly peatbogs, those under (2) swamps, and those under (3) almost everywhere meadows. According to this fact the botanist will find, on an average, most of the rare plants in (1) more than in (2), and here more than in (3). Although he had ascertained that lakes, having a similar soil on their borders, can mostly boast of the same species of plants, he yet had to acknowledge that most of them have, at least according to his explorations, some species, peculiar to one of them; for instance, to Geauga Lake, *Calopogon pulchellus*, *R. Br.*, *Pogonia ophioglossoides*, *Nutt.*, *Drosera rotundifolia*, *Linné*, *Carex retrorsa*, *Schweinitz*, and *Riccia fluitans*,

Lin.; to Strutton Pond, *Xyris flexuosa*, *Muhlenberg*, *Menyanthes trifoliata*, *Lin.*; to Silver Lake, *Eleocharis quadrangulata*, *R. Br.*, *Juncus marginatus*, *Rostk.*; to Chippewa Lake, *Nelumbo lutea*, *Pers.*; to Cottage Grove Lake, *Myosotis laxa*, *Lehm.*, *Rhus copallina*, *Lin.*, *Equisetum lævigatum*, *Braun*, *Heteranthera graminea*, *Vahl*; to Crystal Lake (north of Silver Lake) *Spiræa tomentosa*, *Lin.*, *Eleocharis olivacea*, *Torr.*, *Scirpus debilis*, *Pursh*; to Congress Lake, *Solidago uliginosa*, *Nutt.*, *Gerardia tenuifolia*, *Vahl*. The following species he found on the various lakes, viz: *Vaccinium corymbosum*, *Lin.* (Geauga and Silver Lake), *Cassandra calyculata*, *Don*, (Strutton Pond, Geauga and Crystal Lakes), *Eriophorum virginicum*, *Lin.* (on the same lakes and ponds), *Sarracenia purpurea*, *Lin.* (Geauga Lake and Strutton Pond), *Rhynchospora alba*, *Vahl* (Crystal and Geauga Lakes), *Rhynchospora glomerata*, *Vahl* (Crystal and Silver Lakes), *Dulichium spathaceum*, *Pers.* (Silver, Geauga, Congress and Chippewa Lakes), *Vallisneria spiralis*, *Lin.*, *Brasenia peltata*, *Pursh* (Silver and Geauga Lakes), *Hydrocotyle umbellata*, *Lin.* (Twin and Congress Lakes), *Aster oblongifolius*, *Nutt.* (Geauga and Congress Lakes). Besides these he collected there, *Woodwardia virginica*, *Smith*, *Elodes campanulata*, *Pursh*, *Vaccinium macrocarpon*, *Ait.*, *Pyrus arbutifolia*, *Lin. f.*, *Rhus venenata*, *D. C.*, *Viburnum cassinoides*, *Lin.*, *Glyceria canadensis*, *Trin.*, *Carex Pseudocyperus* var. *americana*, *Hochst.* The botanist, before leaving the lakes, had yet time enough to subject the lakes having peatbogs on their border to close observations; he found that long ago their surfaces of water were larger and that they will gradually disappear, being at last entirely replaced by peatbogs. There are many bogs in this vicinity in place of former lakes, of which one only, a swamp west of Ravenna, Portage County, may be mentioned here. On its lower part it is covered with *Sphagnum recurvatum*, *Beauv.*; it is made almost impenetrable by bushes of *Cephalanthus occidentalis*, *Lin.*, in the shade of which among the moss the delicate *Carex trisperma*, *Dewey*, may be seen. The higher part, the so-called former border, is now covered with woods; several important species live there; for instance, the majestic *Frasera carolinensis*, *Walt.*, *Tephrosia virginiana*, *Pers.*, *Lupinus perennis*, *Lin.*, and *Polygala sanguinea*, *Lin.*, the latter on fields adjoining the woods.

The botanist whose time was until now mostly engaged by the above expeditions was at last able to devote his leisure hours to the territory between the lakes and Lake Erie. Deep ravines, the borders of which are often rocky and covered with trees and shrubs, pass through the counties of this region. Deposits of sand and also of clay, products of the decomposition of sandstone, and slate rocks cover a great part of the lower lands. By the manifoldness and the variety of soil it is but natural that, to the botanist, there appears a flora much different from that observed by him before. With pleasure he visits the ravines of Tinker's Creek (near Bedford), of Big Creek (near Brighton), of Euclid Creek, of the creek at Parma, that near Brecksville (all in Cuyahoga County) and the Nelson Ledges near Garrettsville, Portage County, as also Little Mountain (partly in Lake, partly in Geauga County), the highest elevation in Northern Ohio, and traverses the valley of the Cuyahoga River. Among others he brought home from Tinker's Creek: *Hypericum Ascyron*, *Lin.*, *Juniperus communis* var. *alpina*, *Gaud.*, *Taxus canadensis*, *Willd.*, *Acer spicatum*, *Lam.*; from Big Creek: *Epigæa repens*, *Lin.*, *Asimina triloba*, *Dunal*, *Panicum agrostoides*, *Muhl.*, *Gentiana Andrewsii*, *Griseb.*; from the creek at Euclid: *Astragalus*

Cooperi, *Gray*, *Cassia marilandica*, *Lin.*, *Quercus Prinus*, *Lin.*; from the creek at Parma: *Aristolochia Serpentina*, *Lin.*, the Virginia snakeroot, *Lonicera ciliata*, *Muhl.*, *Festuca nutans*, *Willd.*, *Carex pedunculata*, *Muhl.*, *C. platyphylla*, *Carey*, *C. Willdenowii*, *Schkuhr*, *Carex plantaginea*, *Lam.*, *Eatonia pennsylvanica*, *Gray*, *E. obtusata*, *Gray*, *Cynoglossum virginicum*, *Lin.*, *Conocephalus conicus*, *Dumort.*; from the creek near Brecksville: *Goodyeara pubescens*, *R. Brown*; from Nelson Ledges: *Veronica officinalis*, *Lin.*, *Carex Jamesii*, *Schweiniltz*, *Camptosurus rhizophyllus*, *Link.*, (afterwards found in several ravines always on sandstone rocks); from Little Mountain: *Myrica asplenifolia*, *Endl.*, *Cypripedium acaule*, *Ait.*, *Aralia hispida*, *Vent.*, *Circæa lutetiana*, *Lin.*, *C. alpina*, *Lin.*, both on the same big piece of rock in a moist place. The Valley of the Cuyahoga is wide and extends far; an excursion of a few days even would not make the botanist familiar with its plants, and indeed he has for several years spent his leisure hours there without having reached the end of his explorations, which furnished him the following rare or important plants: *Cacalia suaveolens*, *Lin.* (in one place only about 50 specimens), *Solidago squarrosa*, *Muhl.* (very rare), *Gentiana quinqueflora*, *Lam.*, *Prenanthes alba*, *Lin.*, *Gaura biennis*, *Lin.*, *Quercus palustris*, *Du Roi*, *Silphium perfoliatum*, *Lin.*, *Lophanthus scrophulariæfolius*, *Benth.*, *Holcus lanatus*, *Lin.*, *Eragrostis Purshii*, *Schrader*, *E. Frankii*, *Meyer* (3 specimens only), *Sporobolus vaginæflorus*, *Vasey*, *Solanum carolinense*, *Lin.*, *Riccia natans*, *Lin.* In its upper parts the river forms a ravine with a most grotesquely beautiful scenery. People from near-by and far-off come to see this romantic place, Cuyahoga Falls. Neither the big rocks and the cataracts, however, nor the roaring of the water alone drew the friend of nature, the botanist, to this place; his expectation to become acquainted with new friends was no less the cause of his departure from home. He did not go in vain, as the names of *Asplenium montanum*, *Willd.*, *Muhlenbergia glomerata*, *Trin.*, *Conioselinum canadense*, *Torr. and Gray*, *Chrysosplenium americanum*, *Schwein.*, were entered here on his list, as also *Aconitum noveboracense*, *Gray*, a plant occurring in several counties in the State of New York; it grows here abundantly (several hundred specimens) in the shade of moist rocks.

Although the above lines give the names of many plants, which grow in the vicinity of the botanist's home, yet none of his friends would from this list get an exact idea of the vegetation there; he cannot therefore resist—it is his duty to do it—extending the same by communicating quite a number of more or less important ones, which were found by him in that hill and valley district, but of which, it is needless to state, many were also met with in one or the other of the remaining districts:

Clematis virginiana, *Lin.*, *Anemone cylindrica*, *Gray*, *A. virginiana*, *Lin.*, *A. pennsylvanica*, *Lin.*, *A. nemorosa*, *Lin.*, *Hepatica triloba*, *Chaix*, *H. acutiloba*, *D.C.*, *Anemonella thalictroides*, *Spach*, *Thalictrum purpurascens*, *Lin.*, *T. dioicum*, *Lin.*, *T. polygamum*, *Muhl.*, *Ranunculus abortivus*, *Lin.*, *R. recurvatus*, *Poir.*, *R. ambigens*, *Watson*, *R. pennsylvanicus*, *L.f.*, *Caltha palustris*, *Lin.*, *Aquilegia canadensis*, *Lin.*, *Cimicifuga racemosa*, *Nutt.*, *Actæa alba*, *Bigel.*, *A. spicata* var. *rubra*, *Aiton*, *Coptis trifolia*, *Salisb.*, *Hydrastis canadensis*, *Lin.*, *Magnolia acuminata*, *Lin.*, *Liriodendron Tulipifera*, *Lin.*, *Menispermum canadense*, *Lin.*, *Caulophyllum thalictroides*, *Michx.*, *Jeffersonia diphylla*, *Pers.*,

Podophyllum peltatum, *Lin.*, *Nelumbo lutea*, *Pers.*, *Nymphæa odorata*, *Ait.*,
Nuphar advena, *Ait. f.*, *Sanguinaria canadensis*, *Lin.*, *Dicentra Cucullaria*,
D. C., *D. canadensis*, *D. C.*, *Dentaria diphylla*, *Lin.*, *D. laciniata*, *Muhl.*, *Nasturtium*
officinale, *R. Br.*, *Erysimum cheiranthoides*, *Lin.*, *Helianthemum*
canadense, *Lin.*, *Lechea major*, *Michx.*, *L. minor*, *Lin.*, *Viola palmata*, *Lin.*,
V. sagittata, *Ait.*, *V. hastata*, *Michx.*, *V. rostrata*, *Pursh*, *V. striata*, *Ait.*,
Saponaria officinalis, *Lin.*, *S. Vaccaria*, *Lin.*, (very rare), *Silene stellata*,
Ait., *Stellaria longifolia*, *Muhl.*, *S. longipes*, *Goldie*, *Claytonia virginica*,
Lin., *Hypericum prolificum*, *Lin.*, *Malva moschata*, *Lin.*, *Abutilon Avicennæ*,
Gaertn., *Geranium maculatum*, *Lin.*, *G. carolinianum*, *Lin.*, *Flørkea proserpinacoides*,
Willd., *Oxalis violacea*, *Lin.*, *Celastrus scandens*, *Lin.*, *Evonymus atropurpureus*,
Jacq., *Rhamnus alnifolia*, *L'Her.*, *Ceanothus americanus*, *Lin.*, *Acer saccharinum*,
Wang., *A. dasycarpum*, *Ehrh.*, *A. rubrum*, *Lin.*, *Negundo aceroides*, *Moench*,
Staphylea trifolia, *Lin.*, *Rhus glabra*, *Lin.*, *R. typhina*, *Lin.*, *R. Toxicodendron*,
Lin., *Polygala polygama*, *Walt.*, *P. verticillata* var. *ambigua*, *Nutt.*, *Baptisia tinctoria*,
R. Br., *Lupinus perennis*, *Lin.*, *Lathyrus venosus*, *Muhl.*, *L. palustris*, *Lin.*,
L. ochroleucus, *Hook.*, *Amphicarpæa monoica*, *Nutt.*, *Cassia marilandica*,
Lin., *Gleditschia triacanthos*, *Lin.*, *Prunus virginiana*, *Lin.*, *P. serotina*,
Ehrh., *P. pennsylvanica*, *L. f.*, *Spiræa salicifolia*, *Lin.*, *Rubus odoratus*,
Lin., *R. strigosus*, *Michx.*, *R. villosus*, *Ait.*, *R. occidentalis*, *Lin.*,
Poterium canadense, *Bent. and Hook.*, *Amelanchier canadensis*, *Torr. and Gray*,
Saxifraga virginicensis, *Michx.*, *Ribes floridum*, *L'Her.*, *R. prostratum*,
L'Her., *R. Cynosbati*, *Lin.*, *R. oxycanthoides*, *Lin.*, *Hamamelis virginica*,
Lin., *Echinocystis lobata*, *Torr. and Gray*, *Angelica hirsuta*, *Muhl.*,
Pimpinella integerrima, *Benth. and Hook.*, *Sium cicutæfolium*, *Gmelin*,
Berula angustifolia, *Koch*, *Cicuta maculata*, *Lin.*, *C. bulbifera*, *Lin.*,
Conium maculatum, *Lin.* (very rare), *Erigenia bulbosa*, *Nutt.*, *Hydrocotyle americana*,
Lin., *Aralia nudicaulis*, *Lin.*, *A. racemosa*, *Lin.*, *A. trifolia*, *Decsne. and Planch.*,
A. quinquefolia, *Decsne. and Planch.*, *Cornus florida*, *Lin.*, *C. sericea*,
Lin., *C. circinata*, *L'Her.*, *Nyssa sylvatica*, *Marsh.*, *Sambucus canadensis*,
Lin., *S. racemosa*, *Lin.*, *Viburnum dentatum*, *Lin.*, *V. pubescens*, *Pursh*,
Triosteum perfoliatum, *Lin.*, *Lonicera ciliata*, *Muhl.*, *Houstonia purpurea*
var. *ciliolata*, *Gray*, *Cephalanthus occidentalis*, *Lin.*, *Mitchella repens*,
Lin., *Galium triflorum*, *Michx.*, *G. trifidum*, *Lin.*, *Dipsacus sylvestris*,
Mill., *Vernonia noveboracensis*, *Willd.*, *Eupatorium sessilifolium*, *Lin.*,
E. perfoliatum, *Lin.*, *E. purpureum*, *Lin.*, *Solidago cæsia*, *Lin.*,
S. latifolia, *Lin.*, *S. bicolor*, *Lin.*, *S. uliginosa*, *Nutt.*, *S. patula*,
Muhl., *S. rugosa*, *Mill.*, *S. ulmifolia*, *Muhl.*, *S. arguta*, *Ait.*, *S. juncea*,
Ait., *S. serotina*, *Ait.*, *S. canadensis*, *Lin.*, *S. nemoralis*, *Ait.*, *S. lanceolata*,
Lin., *Sericocarpus conyzoides*, *Nees*, *Aster corymbosus*, *Ait.*, *A. macrophyllus*,
Lin., *A. Novæ-Angliæ*, *Lin.*, *A. patens*, *Ait.*, *A. cordifolius*, *Lin.*, *A. sagittifolius*,
Willd., *A. lævis*, *Lin.*, *A. ericoides*, *Lin.*, *A. dumosus*, *Lin.*, *A. vimineus*,
Lam., *A. diffusus*, *Ait.*, *A. paniculatus*, *Lam.*, *A. prenanthoides*, *Muhl.*,
A. puniceus, *Lin.*, *A. umbellatus*, *Mill.*, *Inula Helenium*, *Lin.*, *Silphium trifoliatum*,
Lin., *Helianthus parviflorus*, *Bernh.*, *H. giganteus*, *Lin.*, *H. doronicoides*,
Lam., *H. strumosus*, *Lin.*, *H. decapetalus*, *Lin.*, *Actinomeris squarrosa*,
Nutt., *Helenium autumnale*, *Lin.*, *Galinsoga parviflora*, *Cav.* (very scarce),
Tanacetum vulgare, *Lin.*, *Artemisia biennis*, *Willd.*, *Cacalia atriplicifolia*,
Lin., *Tragopogon porrifolius*, *Lin.*, *Prenanthes altissima*,

Lin., *Lactuca Scariola*, *Lin.*, *L. leucophæa*, *Gray*, *L. integrifolia*, *Bigel.*,
Lobelia inflata, *Lin.*, *L. cardinalis*, *Lin.*, *Gaylussacia resinosa*, *Torr. and Gray*,
Vaccinium stamineum, *Lin.*, *V. vacillans*, *Solander*, *Gaultheria procumbens*,
Lin., *Chimaphila umbellata*, *Nutt.*, *C. maculata* *Pursh*, *Monotropa uniflora*,
Lin., *M. Hypopitys*, *Lin.*, *Lysimachia quadrifolia*, *Lin.*, *Apocynum andro-*
sæmifolium, *Lin.*, *A. cannabinum*, *Lin.*, *Asclepias tuberosa*, *Lin.*, *A. Cornuti*,
Decaisne, *A. incarnata*, *Lin.*, *A. phytolaccoides*, *Pursh*, *A. quadrifolia*, *Lin.*,
A. purpurascens, *Lin.*, *Vincetoxicum nigrum*, *Moench* (on R. R.), *Gentiana*
quinqueflora, *Lin.*, *Hydrophyllum virginicum*, *Lin.*, *H. canadense*, *Lin.*, *H.*
appendiculatum, *Michx.*, *Cynoglossum officinale*, *Lin.*, *Echinosperrum*
Lappula, *Lehm.*, *Echium vulgare*, *Lin.* (on R. R.), *Mertensia virginica*, *D. C.*,
Solanum Dulcamara, *Lin.*, *S. nigrum*, *Lin.*, *S. rostratum*, *Dunal* (1 specimen
 on R. R.), *Physalis pennsylvanica*, *Lam.*, *P. viscosa*, *Lin.*, *Datura Stramo-*
nium, *Lin.*, *Verbascum Thapsus*, *Lin.*, *V. Blattaria*, *Lin.*, *Linaria vulgaris*,
Mill., *Chelone glabra*, *Lin.*, *Mimulus ringens*, *Lin.*, *Veronica virginica*, *Lin.*,
Gerardia quercifolia, *Pursh*, *G. flava*, *Lin.*, *Pedicularis canadensis*, *Lin.*,
Epiphegus virginiana, *Bart.*, *Conopholis americana*, *Wallroth*, *Aphyllon*
uniflorum, *Gray*, *Tecoma radicans*, *Juss.*, *Verbena urticæfolia*, *Lin.*, *V.*
hastata, *Lin.*, *Collinsonia canadensis*, *Lin.*, *Mentha piperita*, *Lin.*, *M. viridis*,
Lin., *Pycnanthemum lanceolatum*, *Pursh*, *Melissa officinalis*, *Lin.* (on
 road outside of a village), *Hedeoma pulegioides*, *Pers.*, *Monarda didyma*, *Lin.*,
M. fistulosa, *Lin.*, *Blephilia hirsuta*, *Benth.*, *Scutellaria lateriflora*, *Lin.*, *S.*
canescens, *Nutt.*, *S. versicolor*, *Nutt.*, *Leonurus Cardiaca*, *Lin.*, *Chenopodium*
urbicum, *Lin.*, *C. Botrys*, *Lin.*, *C. ambrosioides*, *Lin.*, *Atriplex patulum*, *Lin.*,
Phytolacca decandra, *Lin.*, *Polygonum lapathifolium*, *Lin.*, *P. amphibium*,
Lin., *P. pennsylvanicum*, *Lin.*, *P. virginicum*, *Lin.*, *P. sagittatum*, *Lin.*, *P.*
arifolium, *Lin.*, *Asarum canadense*, *Lin.*, *Saururus cernuus*, *Lin.*, *Sassafras*
officinale, *Nees*, *Lindera Benzoin*, *Blume*, *Dirca palustris*, *Lin.*, *Shepherdia*
canadensis, *Nutt.*, *Euphorbia Preslii*, *Guss.*, *E. corollata*, *Lin.*, *E. Cyparissias*,
Lin., *Celtis occidentalis*, *Lin.*, *Morus rubra*, *Lin.*, *Urtica dioica*, *Lin.*,
Platanus occidentalis, *Lin.*, *Corylus americana*, *Walt.*, *Ostrya virginica*,
Willd., *Quercus alba*, *Lin.*, *Q. rubra*, *Lin.*, *Q. macrocarpon*, *Michx.*, *Q.*
bicolor, *Willd.*, *Aplectrum hiemale*, *Nutt.*, *Corallorhiza odontorhiza*, *Nutt.*,
C. multiflora, *Nutt.*, *Spiranthes latifolia*, *Torr.*, *S. cernua*, *Rich.*, *S. gracilis*,
Bigelow, *Habenaria orbiculata*, *Torr.*, *H. lacera*, *R. Br.*, *H. psycodes*, *Gray*,
Cypripedium pubescens, *Willd.*, *Iris versicolor*, *Lin.*, *Sisyrinchium anceps*,
Cav., *S. angustifolium*, *Mill.*, *Dioscorea villosa*, *Lin.*, *Smilax herbacea*, *Lin.*,
S. hispida, *Muhl.*, *Allium tricoccum*, *Ait.*, *A. canadense*, *Kalm*, *Smilacina*
racemosa, *Desf.*, *Uvularia perfoliata*, *Lin.*, *Oakesia sessilifolia*, *Watson*,
Erythronium albidum, *Nutt.*, *E. americanum*, *Ker.*, *Lilium canadense*, *Lin.*,
Medeola virginica, *Lin.*, *Trillium erectum*, *Lin.*, *T. grandiflorum*, *Salish.*,
Pontederia cordata, *Lin.*, *Juncus articulatus*, *Lin.*, *J. alpinus* var. *insignis*,
Fries, *J. nodosus*, *Lin.*, *Arisæma triphyllum*, *Torr.*, *Peltandra undulata*, *Raf.*,
Acorus Calamus, *Lin.*, *Cyperus filiculmis*, *Vahl*, *Carex intumescens*, *Rudge*, *C.*
lupulina, *Muhl.*, *C. monile*, *Tukerman*, *C. lurida*, *Wahl.*, *C. hystricina*, *Muhl.*,
C. squarrosa, *Lin.*, *C. stricta*, *Lam.*, *C. crinita*, *Lam.*, *C. Tukermani*, *Dewey*,
C. virescens, *Muhl.*, *C. gracillima*, *Schwein.*, *C. granularis*, *Muhl.*, *C. laxiflora*,
Lam., *C. digitalis*, *Willd.*, *C. varia*, *Muhl.*, *C. pennsylvanica*, *Lam.*, *C. debilis*
 var. *Rudgei*, *Bailey*, *C. stipata*, *Muhl.*, *C. teretiuscula*, *Gooden.*, *C. vulpinoidea*,

Michx., *C. rosea*, *Schkuhr*, *C. cephaloidea*, *Dewey*, *C. cephalophora*, *Muhl.*, *C. echinata* var. *cephalantha*, *Bailey*, *C. canescens*, *Lin.*, *C. bromoides*, *Schkuhr*, *C. tribuloides*, *Wahl.*, *C. straminea*, *Willd.*, *Leersia oryzoides*, *Swartz*, *L. virginica*, *Willd.*, *Zizania aquatica*, *Lin.*, *Andropogon furcatus*, *Muhl.*, *A. scoparius*, *Michx.*, *Deschampsia flexuosa*, *Vasey*, *Cinna arundinacea*, *Lin.*, *Eleusine indica*, *Gaertn.*, *Poa alsodes*, *Gray*, *P. brevifolia*, *Muhl.*, *Festuca nutans*, *Willd.*, *Asprella Hystrix*, *Willd.*, *Equisetum robustum*, *Braun*, *Polypodium vulgare*, *Lin.*, *Adiantum pedatum*, *Lin.*, *Pteris aquilina*, *Lin.*, *Asplenium Trichomanes*, *Lin.*, *A. angustifolium*, *Michx.*, *A. thelypteroides*, *Michx.*, *Aspidium cristatum*, *Swartz*, *A. Goldianum*, *Hooker*, *A. acrostichoides*, *Swartz*, *Botrychium virginicum*, *Swartz*, *B. ternatum*, *Swartz*, *Lycopodium lucidulum*, *Michx.*, *Marchantia polymorpha*, *Lin.*, *Leucobryum vulgare*, *Hampe*, *Timmia megapolitana*, *Hedwig*, *Ceratodon purpureus*, *Bridel*, *Atrichum undulatum*, *Beauv.*, *A. angustatum*, *Beauv.*, *Funaria hygrometrica*, *Hedw.*, *Bartramia pomiformis*, *Hedw.*, *Aulacomnion heterastichum*, *B. and S.*, *Physcomitrium pyriforme*, *B. and S.*, *Climacium dendroides*, *Web. and Mohr*, *Polytrichum gracile*, *Menzies*, *P. juniperinum*, *Hedw.*

The botanist, after having mentioned in the above lines many of his darlings and the places of their residence, is convinced that he has omitted quite a number that are equally dear to him. He knows—and finds some consolation therein—that all work of man is more or less imperfect. Nothing, however, but the expectation of seeing and greeting the omitted ones again at a time not far distant, causes him to forget his neglect and to sketch again plans for future travelling over hills and through valleys to the islands and lakes.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, March 15, 1892.

On motion of Mr. C. C. Meyer, Wm. B. Webb, Ph.M., was called to preside.

The minutes of the last meeting were read, and no corrections being called for, they stand approved.

The following donations to the library were made on behalf of Mr. Hans M. Wilder: *Receptirkunst*, by H. Hager; *Pharmacopœæ recentiores*, by H. Hager; *Allgemeine Pharmakopöe*, by F. L. Strumpf; *Commentar*, by H. Hager (2 vol.), by F. Mohr (1 vol.), and by Dulk (2 vol.); *Pharmaceutische Technik*, by F. Mohr; *Anorganische Chemie*, by R. Arend; *Organische Chemie*, by F. Wöhler; *Ure's Dictionary of Chemistry*; *Cell Doctrine*, by Dr. Jas. Tyson; *Domestic Medicine*, by W. Buchan, M.D.; *Hance's Medical Compendium and Formulary*, and *American Journal of Pharmacy* for 1834.

On motion, a vote of thanks was returned to Mr. Wilder.

The Chairman said that the Paddock Bill, which recently passed the Senate, had been put down as a subject for discussion. The clause defining adulteration was then read.

Professor Maisch said that the enactment of a stringent law for the prevention and punishment of adulterations was very desirable; yet he could not join in the assertion sometimes made, that adulterations were more commonly practised now than in the past. It was a matter of history that, in the middle ages, persons convicted of such frauds had been burned to death. It

was, however, unquestionably true that with the general spreading of knowledge, the more clumsy methods formerly practised were abandoned in favor of others. He was of the opinion that the demand for good articles at fair prices would bring good articles, and that the success in the sale of poor articles was largely due to the demand for articles cheaper than they can be honestly produced. Ground spices, for instance, are often sold for less than the same spices in their natural condition can be bought; and consumers are aware of that fact or could easily ascertain it.

Mr. Thompson suggested that there were three parties concerned in this business of debasing drugs and food products; they were the buyer, the seller and the devil; the latter being intangible, the blame must rest practically with the others; the buyer generally is the more culpable, because he is looking for the cheaper article, which, of course, drives the seller to obtaining the lower grade, and this may possibly be injurious to health. The microscope, however, of late years has been used with most salutary results in checking or at least in exposing these frauds.

As a proof that fair prices will bring good articles, Professor Maisch instanced the article of virgin scammony, which, as met with in our market thirty or forty years ago, usually contained only about forty per cent. of resin, while standard authorities called for eighty per cent. But after Dr. Squibb had induced some importers to import for his use virgin scammony, without limitation of price, the drug could be had with from 80 to over 90 per cent. of resin, and it is now sold by actual assay. Another fact worthy of consideration is, that it is extremely difficult to define precisely what adulteration is, since the public have become so accustomed to certain additions, that in some cases absolutely pure articles were almost unsalable. Ground yellow mustard had often been mentioned as such an article, which most persons would not purchase unless it had been colored yellow by turmeric; and it was an open secret that much of the butter sold was more or less improved in color by annotta or similar matter. Many of such additions were not injurious to health; yet it was certainly a fraud to sell as pure lard a mixture of lard and the solid fat of cotton-seed oil. He thought that there was probably not half a pound of absolutely pure saffron in Philadelphia or others of our large cities; the best European saffrons generally sold, contained some impurities besides the stigmas, sometimes amounting, perhaps, to only three per cent., but frequently to more, and consisting of styles, and occasionally also of stamens and shreds of the corolla. Even the best of such saffron could not be sold in some localities in Eastern Pennsylvania where saffron is raised for home consumption, and where it had been the custom of parting with any surplus only for its weight of silver.

Several members referred to cases of fraud which had been exposed in former years, like an adulterant for castor-oil that had been offered by a Cleveland house; the selling by a New York house of cinchonine hydrochloride for quinine sulphate, in bottles bearing the counterfeit label of Pelletier in Paris; the manufacture in this city of colored biscuits for use in the adulteration of ground spices; also the adulteration of lycopodium with corn starch, and others.

It was stated that some wholesale dealers claimed that articles ground at drug mills might be adulterated without their knowledge; but in reply it was said

that some parties would expect the weight of the ground drug to be equal to that of the crude drug furnished, while there was an unavoidable loss by drying, unpowdered remnants and by handling.

Professor Trimble gave the results of the assay of a number of preparations which has been procured from retail stores, and said that he would embody the figures in a paper; the examination showed much want of care on the part of some retailers.

A paper on *Sodium Benzoate*, by H. F. Kaercher, of the present senior class, was read, and led to a discussion about the various kinds of benzoic acid on the market; it was stated that benzoic acid sublimed from benzoin could be procured, but that a great deal was artificially prepared from toluol; also that formerly there was a variety on the market made from the urine of cattle, to which the urinous odor adhered very persistently until it had been sublimed with some benzoin.

F. W. Haussmann's paper *upon soda mint* was read by Dr. C. B. Lowe. The discussion showed that spearmint water had been used by nearly all the members present.

Dr. Lowe exhibited *Shannon's prescription file* and cases. It consists of a board with two curved steel wires and a covering board with spring, which keeps the prescriptions flat. To examine a prescription the covering board is raised and thrown back, when the prescriptions can be slid back upon the curved wire until the one wanted is found. The cases are made somewhat like the sides and back of a book, the bottom board of the file being fastened to one side of the case when the file is filled and ready to be put away; a pasteboard cover fits over the ends and side of the file to enclose it and prevent access of dust. It is made by the Office Specialty Company, of Rochester, N. Y.

Mr. Beringer sent the *Lehman prescription file* for inspection of the meeting. It consists of a small inclined board fastened to a little case containing a wrench, eyelets and washers; the prescriptions are perforated by the eyeleting machine, and when two hundred have been collected the washer is slipped over the end of the eyelet, which is then crimped down, securely locking all the prescriptions; the prescriptions are then packed in small flat boxes of a size suited to the prescription papers, and packed away in a tin frame, which will hold eight such boxes; on the end of the box the initial and concluding number of each series is marked; the frame is so arranged that each one added fits on the top of the last one filled up. It is made by the Minneapolis (Minn.) Specialty Manufacturing Company.

Mr. England exhibited a sample of *Ammonium carbonate* tinged with iron; also *piperazin*, a derivative of piperine and a solvent for uric acid; it is made by E. Schering, of Berlin.

There being no further business, adjournment was moved and carried.

T. S. WIEGAND, *Registrar.*

EDITORIAL.

Professor F. B. Power, with the present month, severs his connection with the School of Pharmacy of the University of Wisconsin, which, under his guidance since its organization, nine years ago, has established a well-deserved reputation, not only in the State, but far beyond its boundaries. Professor

Power will hereafter reside at Passaic, N. J., where the preparation of volatile oils and allied products will be carried on under his direction, affording him ample opportunities for continuing his researches in a congenial field. Previous to his departure from Madison a farewell banquet was tendered him by his friends at the hotel Van Etta, on the evening of March 23d.

The Massachusetts College of Pharmacy has filled the vacancy occasioned by the death of Professor Pengra, by calling Dr. R. W. Greenleaf, who had been for some time connected with the College, to the chair of *Materia Medica* and Botany. In the same College the chair of Pharmacy became vacant through the resignation of Prof. Patch, owing to the demands upon his time by business affairs. This vacancy was filled by the appointment of Professor G. F. H. Markoe, who has been a member of the faculty since the College became a teaching institution in December 1867.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The Pharmaceutical Review, a monthly journal, published in the interest of pharmacy and allied sciences. Baltimore. 4to. Price, \$2 per year.

This is the title of a new journal which is published under the auspices of the Maryland College of Pharmacy, and of which Prof. Chas. Caspari, Jr., is the editor. It begins its course with a very creditable number of twenty pages, containing original articles on scientific subjects by Prof. W. Simon, and Dr. A. Dohme, and on business subjects by C. V. Emich, Dr. D. R. Slack and J. P. Piquett. In addition thereto editorials, résumés of pharmaceutical literature, college news, etc.

Proceedings of the Michigan State Pharmaceutical Association, at its ninth annual meeting, held at Ann Arbor, October 20, 21, 22, 1891. Detroit. 8vo. Pp. 140.

Besides the discussions on cut rates and the proposed methods for curing that evil, the reading and discussion of papers occupied much of the time of the association. Many of the papers, a number of which had been previously published in the last volume of this journal, came from the University of Michigan, and were mostly presented in abstract, such as the work done on the examination of chemicals with regard to their purity, the determination of adulterations in various articles, etc. Professor Stevens contributed elaborate saturation tables; Prof. Vaughan made an address on the relation of pharmacy to medicine, and Prof. Abel discoursed on the methods of pharmacology and demonstrated the effects of several drugs upon animals. The executive officers for the year are H. G. Colman, Kalamazoo, president; Wm. Dupont, Detroit, treasurer; C. W. Parkins, Detroit, secretary, and J. D. Muir, Grand Rapids, local secretary. The tenth annual meeting will be held at Grand Rapids, commencing August 2, next.

Practical and Analytical Chemistry. A complete course in chemical analysis. By Henry Trimble, Ph. M., Professor of Analytical Chemistry in the Philadelphia College of Pharmacy. Fourth edition, with illustrations. Philadelphia: P. Blakiston, Son & Co., 1892. 8vo. Pp. 119.

It affords us much pleasure to note the appearance of a new edition of this

work, of the value of which, for educational purposes and for reference, we have heretofore advised our readers (see this Journal, 1885, 462; 1886, 414). It remains for us now to merely state that the work has been revised, additions or changes having been made wherever experience had shown such to be desirable or useful, so that in its present shape it will be found to be fully as acceptable as heretofore.

Jahresbericht. (Annual Report.) E. Merck, Darmstadt. January, 1892. Pp. 87.

One of the papers relates to the alkaloid *atropamine*, which the author prepared from mother-liquors of atropine; it was demonstrated to be identical with *apoatropine*. The second paper gives the results of some observations on commercial oils of eucalyptus, and on the preparation of terpin hydrate from the same. The remainder of the report gives résumés of the action, character, etc., of a large number of recently introduced remedies. In the appended literary list, the American Journal of Pharmacy is quoted as being published in New York instead of Philadelphia.

Sixth Annual Report of the Massachusetts Board of Registration in Pharmacy. For 1891.

During the year, 315 candidates applied for examination and registration, of which number 115 were successful.

Ueber Dichlormethylparaconsäure. Von Harry C. Myers, Cleveland, O. 8vo. Pp. 16.

On dichlormethylparaconic acid is the title of this inaugural dissertation, presented by the author to the faculty of mathematics and natural history of the University of Strassburg. It gives the process for preparing this acid and a number of its salts; also analyses of the same.

The reception of the following pamphlets on medical subjects is acknowledged:

Notes on general versus local treatment of catarrhal inflammations of the upper air-tract. By Beverly Robinson, M. D., New York.

Reprint from the Climatologist, December, 1891.

Tuberculin: the value and limitation of its use in consumption. By Chas. Denison, A. M., M. D., etc., Denver, Col.

Reprint, with revisions up to February 1, 1892, from the Transactions of the Colorado State Medical Society for 1891.

An account of the Influenza as it appeared in Philadelphia in the winters of 1889-'90 and of 1891-'92. By J. Howe Adams, M. D., Philadelphia.

Reprint from University Medical Magazine, February, 1892.

Tobacco, Insanity and Nervousness. By Dr. L. Bremer. Published by the Meyer Bros. Druggist. St. Louis, Mo., 1892.

Read before the St. Louis Medical Society.

Proceedings of the California Pharmaceutical Society and College of Pharmacy for the years 1890 and 1891. San Francisco, 1892. 8vo. Pp. 136.

The book contains the minutes of, and the papers read at, the semi-annual meetings of the Society held in San José, 1890, and in Stockton, 1891, and of

the annual meetings, held November 1890 and 1891, at the hall of the College of Pharmacy in San Francisco; also, accounts of the graduating exercises of the College at the close of its lecture seasons in October of the years named. The executive officers of the Society and the College are: John Devine, president; D. D. Hunt, secretary, and Adolph Mack, treasurer. The vacancy which was occasioned through the resignation of Professor E. W. Runyon, has been filled by calling Henry F. Meier to the chair of Pharmacy.

Report of the Proceedings of the Illinois Pharmaceutical Association at its twelfth annual meeting, held at Kankakee August 25-27, 1891. 8vo. Pp. 178.

It contains the minutes, with the discussions incorporated, the reports of committees, papers read, the State pharmacy law, etc., but no index or list of contents. The portrait of A. A. Culver, president of the preceding year, is attached as frontispiece. The present officers are R. C. Hattenhauer, Peru, president; Melle Williams, Taylorville, treasurer; C. S. Hallberg, Chicago, secretary, and Chas. Ryan, Springfield, local secretary. The next meeting will convene at Springfield, June 14, next.

Proceedings of the tenth annual meeting of the Indiana Pharmaceutical Association, held in Indianapolis May 6 and 7, 1891. 8vo. Pp. 108.

A brief account of the transactions will be found on page 370 of our last volume. The next meeting will be held at Indianapolis May 10, next. J. F. Hurty is chairman of the executive committee.

Proceedings of the Ohio State Pharmaceutical Association at its thirteenth annual meeting held in Dayton June 9-11, 1891. 8vo. Pp. 162.

The transactions at this meeting were reported on page 371 of our last volume. In addition to the usual matter contained in such publications, complete lists of the registered pharmacists and assistant pharmacists are published in the volume before us. The frontispiece is a portrait of the late Alfred Mayell of Cleveland. The association will meet again at Canton June 14, next; J. H. Openheimer is the local secretary.

Elixirs and Flavoring Extracts: their history, formula and methods of preparation. By J. U. Lloyd, Professor of Chemistry in the Eclectic Medical Institute, etc. New York: Wm. Wood & Co. 1892. 8vo. Pp. 191.

This essay opens with a short dissertation on the etymology of the word elixir, furnished by Dr. Chas. Rice, and with the fac-simile reproduction, from a work of 1682, of the formulas for elixir album and elixir rubrum, which were recommended for use in the transmutation of the baser metals into silver or gold. After giving a historical sketch of the introduction of the modern elixirs and of their increase in number in North America, the author gives formulas for 271 different elixirs, which are more or less in use in some parts of this country; also formulas for flavoring extracts, soda-water syrups, colors, frothing-liquids and similar soda-water appliances. It is a practical book and gives much useful information on details.

The Book of Prescriptions, containing upwards of 3000 prescriptions collected from the practice of the most eminent physicians and surgeons, English and foreign; comprising also a compendious history of the materia medica, lists of the doses of all official or established preparations and an index of

diseases and remedies. By Henry Beasley. Seventh edition. Philadelphia : P. Blakiston, Son & Co. 1892. 16mo. Pp. 599.

The title of this compilation is quite descriptive of the contents of the book. The remedies, arranged in alphabetical order, are briefly defined as to origin and character; then their medical properties are named, and the diseases in which each drug has been recommended; and finally the behavior to solvents, the vehicle in which the drug is best exhibited, the dose, and the pharmaceutical preparations containing the drug. Such information is introductory to the formulary proper. As might be expected the number of prescriptions given varies very considerably, and naturally is depending upon the importance of each drug as a remedial agent. The selections appear to have been well made, credit being given to a large number of prominent physicians. An index of diseases is appended, in which the various drugs are indicated, under the heads of which appropriate prescriptions are found.

OBITUARY.

Professor Dr. Hermann Kopp died at Heidelberg February 20, 1892, in the seventy-fifth year of his age. He was the son of Joh. Heinrich Kopp, M.D., a physician of considerable reputation, and was born in Hanau, October 30, 1817. After studying natural sciences at the universities of Heidelberg, Marburg and Giessen, he was connected with the latter as lecturer (1841), professor extraordinary (1843) and professor of physics and chemistry (1853) until 1864, when he accepted a similar position at the university of Heidelberg, retiring from the chair in 1890. His researches were mainly devoted to chemical physics, such as atomic volume, crystallography, isomorphism, boiling point, specific gravity, the relation of chemical composition and physical properties, etc., the results of his labors having been mostly published in Poggendorff's *Annalen* and in the *Annalen der Chemie und Pharmacie* (Liebig's). Of the latter periodical he was co-editor with Liebig, Woechler and others from 1851 to 1871; from 1847 to 1862 co-editor of the *Jahresbericht der Chemie*, and one of the contributors to the *Handwörterbuch* (1842-1861). Aside from his important labors in the laboratory and in connection with the publications indicated, his historical studies are of pre-eminent value. His history of chemistry appeared in 1843 to 1847 in four volumes, and was followed from 1869 to 1875 by three volumes of contributions to the history of chemistry; in 1873 by a stately volume treating of the development of chemistry in modern times, and in 1886 by two volumes on the history of alchymie. As a teacher Kopp was highly appreciated not only for his eminent knowledge, but likewise for urbanity and kindly interest in his students.

Wellington H. Boyle died near Hughesville, Pa., January 30, 1892. Previous to 1871 Mr. Boyle attended for a series of years to the business of the American Journal of Pharmacy, while the late Chas. Ellis was chairman and treasurer of the publication committee. Mr. Boyle was for more than thirty years connected with the house of Chas. Ellis & Co., afterward Chas. Ellis, Son & Co., and for some time was one of the partners. After the dissolution of the firm about fourteen years ago he lived on his farm, where he died in the seventy-eighth year of his age.

Samuel Campbell, Ph.G., died in Philadelphia, February 19, 1892, of consumption, aged 56 years. He was an apprentice of the late Henry C. Blair and graduated from the Philadelphia College of Pharmacy in 1857. He was in business for several years in this city, and subsequently was associated with several manufacturing firms. He paid much attention to the perfection of the process of percolation, and contributed to this Journal a number of papers on this subject and on fluid extracts.

Dr. Theophilus Redwood, Emeritus Professor of Chemistry and Pharmacy to the Pharmaceutical Society of Great Britain, died March 5 last, at Boverton, Glamorganshire, South Wales, in the house where he was born March 2, 1806. His early education was obtained from his father who was a schoolmaster in the village named. After spending three years as apprentice to the drug business in Cardiff, he had the good fortune of securing, in 1823, an engagement with John Bell & Co., in London. Faithful in the discharge of all his duties, he was promoted from one position to another, and when Jacob Bell, who was four years younger than Redwood, became connected with the business a warm attachment between the two was formed and, fostered by their common studies, ripened into friendship which was only severed by the death of Mr. Bell, in 1859. In 1830, Redwood began business on his own account in Crawford Street, London, and while building up the dispensing business, manufactured some chemical and pharmaceutical products, devoting especial attention to the perfection of the preparation of extracts *in vacuo*. When, in 1841, through the energetic efforts of Jacob Bell and his associates the Pharmaceutical Society of Great Britain was founded, the establishment of a school of pharmacy was taken in hand, and the publication of the *Pharmaceutical Journal* was commenced, Mr. Bell being the editor and proprietor; but at his death the copyright was transferred to the Pharmaceutical Society. Mr. Redwood acted as sub-editor from the commencement until at Mr. Bell's death he became editor-in-chief until 1870, and remained a valued contributor to its pages until his retirement from active duties, in 1886. Pharmaceutical meetings were inaugurated by the Society in May, 1841, and beginning with January, 1842, were held in the home acquired by the Society at 17 Bloomsbury Square; in the promotion of the objects of these meetings Prof. Redwood was indefatigable; his influence upon their scope and character is best judged from the minutes as published in the *Pharmaceutical Journal*, which show the vast amount of information that he could impart on all subjects pharmaceutical.

Professor Redwood's career as teacher commenced with the opening of the school at Bloomsbury Square, in 1842, when he lectured on pharmacy, until in 1846 Prof. Fownes, owing to ill health, was compelled to resign the chair of chemistry, when both branches were entrusted to Prof. Redwood, who had already been in charge of the laboratory, opened in 1844, and enlarged the year following—the first one in Great Britain for instruction in chemistry and pharmacy by practical operations, in which the students were engaged throughout the day, under the guidance of a professor. To the Chemical Society he served as one of the secretaries from 1852 to 1865, and then as treasurer until 1870. He was also secretary of the Cavendish Society from its foundation in 1864, and honorary secretary of a committee of pharmacists,

appointed in 1854, to assist in remodelling the London Pharmacopœia. The first British Pharmacopœia published in 1864, not proving satisfactory, Professor Redwood prepared a new edition which appeared in 1867, and the addenda in 1874; he was also the pharmaceutical editor of the last edition published in 1885. When the British Pharmaceutical Conference was organized in 1864, he was made one of the vice-presidents, and for two years, 1876 and 1877, he was elected president. In 1869 he represented the Pharmaceutical Society at the International Pharmaceutical Congress held at Vienna, and in 1881 he was made President of the fifth Congress which convened in London. In 1840, he prepared an English elaboration of F. Mohr's German work on pharmaceutical technics, which was subsequently republished in Philadelphia, having been edited and adapted for American pharmacists by the late Prof. Wm. Procter. Gray's Supplement to the Pharmacopœia was revised and rewritten by Prof. Redwood, and three editions were published in 1847, 1848 and 1857. He also edited several editions of Pereira's *Selecta à Prescriptis*, and for the abridged edition of 1872 of Pereira's *Materia Medica*, he contriouted the portion relating to chemistry and pharmacy. He was public analyst for the county of Middlesex, for the London districts of Holborn and St. Giles, and for the borough of Luton, assisted in these duties by his son T. Horne Redwood and by A. J. de Hailes.

Professor Redwood's life was one of well-directed labor extending over a period of sixty-six years, dating from the commencement of his apprenticeship. That he was appreciated as a teacher was shown as early as 1850, when about one hundred of his pupils presented him with a costly service of plate as an expression of their gratitude, and later, in 1887, when a subscription was started for the foundation of a scholarship, which was consummated in 1888, and will hereafter be associated with the research laboratory of the Pharmaceutical Society of Great Britain. The value of his labors in science was recognized by the conferring upon him by the University of Giessen, of the degree of Ph.D., when Liebig, in 1852, retired from that institution, to accept a chair in Munich. A number of societies conferred honorary membership upon him; among others, this was done by the American Pharmaceutical Association and by the Philadelphia College of Pharmacy.

VARIETIES.

Monochlorphenol is stated by Dr. Passerini (*Brit. Med. Jour.*) to be a powerful antiseptic free from the disagreeable odor and from the caustic and irritant action of trichlorophenol, and is recommended as an inhalation in tuberculosis and other pulmonary affections.

[There are three chlorophenols C_6H_5ClO , as follows :

<i>Ortho</i>	chlorophenol,	melting point	7°,	boiling point	175°
<i>Meta</i>	"	"	28.5°,	"	214°
<i>Para</i>	"	"	37.	"	217°

Editor Am. Jour. Pharm.]

Ichthyol, in doses of 0.01 to 0.02 gm., has been found useful by Dr. Thör in pyrosis, the sour eructations disappearing without leaving an disagreeable effect.—*Med. Surg. Rep.*, Jan. 23, 1892.

THE AMERICAN JOURNAL OF PHARMACY.

MAY, 1892.

EUPATORIUM ROTUNDIFOLIUM.

BY FRED. C. SHAW, PH.G.

From a Thesis.

The air-dry flowering plant was examined with the following results:

Moisture,	8'40
Ash,	4'58
Petroleum ether extracted, fat,	1'11
Wax and caoutchouc,	2'81
	<hr/>
Stronger ether extracted resin and chlorophyll,	3'92
Absolute alcohol extracted resin and glucoside,	2'40
Water extracted mucilage,	0'96
Dextrin,	3'43
Glucose,	2'16
	<hr/>
Alkaline water extracted extractive,	3'65
Pectin and albuminoids,	3'20
	<hr/>
Acidulated water extracted pararabin,	0'86
Calcium oxalate,	2'04
	<hr/>
Hot water extracted inulin,	2'90
Chlorine water extracted lignin,	0'89
HNO ₃ and HKClO ₃ extracted incrusting matter,	3'70
Residue : Cellulose,	8'88
	<hr/>
	48'16
	<hr/>
	100'00

The extract obtained with absolute alcohol was treated with water, and the aqueous solution rendered acid and agitated successively with petroleum ether, ether and chloroform. The aqueous

solution was then rendered alkaline and treated as before. On evaporating these liquids separately, it was found that ether had extracted from both the acid and the alkaline solutions a bitter principle which responded to tests for a glucoside, but was not obtained in a pure state.

ANALYSIS OF THE BARK OF POPULUS ALBA, *Linné.*

BY MILTON FRANK SCHAACK, PH.G.

Abstract from a Thesis.

The bark of trees grown in the United States was reduced to a fine powder, of which 50 gm. were treated according to Dragen-dorff's method, with the following results:

Petroleum ether extract,		2'110
Soluble in alcohol,	1'804	
Insoluble in alcohol,	'306	
Stronger ether extract,		1'036
Soluble in water,	'030	
Alcohol,	'854	
Ether only,	'152	
Absolute alcohol extract,		4'652
Soluble in water,	2'766	
Insoluble in water,	1'886	
Aqueous extract,		9'100
Mucilage,	1'750	
Glucose,	'180	
Saccharose,	'216	
Undetermined,	6'954	
Caustic soda extract,		2'288
Pectin,	1'040	
Not precipitated by alcohol,	1'248	
Hydrochloric acid extract,		7'852
Pararabin,	2'964	
Calcium oxalate,	4'780	
Undetermined,	'108	
Chlorine water extract,		3'620
Lignin and incrusting,	3'620	
Nitric acid and chlorate of potassium extract,		20'740
Intercellular substance,	20'740	
Residue,		40'920
Containing ash,	4'500	
Pure cellulose,	36'420	
Moisture,	6'500	6'500
Loss,	1'820	1'820
	<hr/> 100'000	<hr/> 100'000

The liquid obtained with stronger ether had a lighter yellow color, a bitter taste and a slightly acid reaction, and did not respond to tests for gallic acid or alkaloids. The bitter principle was partly taken up by water, and the remainder by alcohol, was wholly soluble in amylic alcohol, could not be obtained crystallized, and reduced Fehling's solution.

The tincture made with absolute alcohol was dark green, very bitter and slightly astringent. Petroleum ether removed from the extract a somewhat acrid principle, which on standing acquired a vanilla-like odor. Ether removed a bitter resinous substance; chloroform a granular bitterish and sweet substance; and the residue was a very bitter extract.

Different processes were followed with the view of isolating the bitter principle; but it could not be crystallized. However, the bitter extracts treated with sulphuric acid and potassium bichromate developed the odor of salicylic aldehyde. This reaction, the bitter taste of the bark and the sweet taste of the principle dissolved by chloroform suggest the presence of salicin and populin.

Calcium oxalate is present in the bark; also a compound resembling tannin in its behavior to ferric chloride, but not precipitated by gelatin.

The bark used for these experiments was 2 or 3 mm. thick; the smooth, greenish-white outer surface is marked with small warts, usually arranged in transverse lines, and is easily scraped off from the green layer. The inner surface is longitudinally striate. The bark breaks, transversely and longitudinally, with a short fracture. Viewed under the microscope, a thin suberous layer is seen; the primary bark contains raphides, imbedded in the parenchyma; the liber has the fast fibres in small bundles arranged in tangential lines, accompanied by raphides, and separated by broad layers of parenchyma; the medullary rays consist, upon transverse section, near the inner surface of one row of cells, but become much broader towards the outer layer. The leaf has, beneath its upper surface, a double row of palisade cells.

Note by the Editor.—When Braconnot, in 1830, discovered populin in the bark of *Populus tremula*, he made also some observations with the bark of *P. alba*, which seemed to indicate the presence of the same compound. From the latter bark he isolated a notable quantity of salicin. In 1835 J. E. Herberger isolated from 6 oz.

of the air-dry leaves of *P. alba* 3 grains of pure populin and 12 grains of pure salicin; but the autumnal leaves of the latter tree were not bitter, and contained no salicin. Incidentally he remarked that the preparation of salicin was much more easily effected from the poplars than from willow bark.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

Diuretin in infantile practice.—Dr. R. Demme (*Semaine médicale*, 1892, No. 10) reports that doses of diuretin ranging from 0.50 to 1.50 gm. can be administered to children of two to five years, and 1.50 gm. to 3.00 gm. to those of six to ten. For children under the age of one year diuretin is contraindicated, as it is apt to produce gastro-intestinal irritation. A good way of exhibiting diuretin is: Diuretin, 1.50 gm.; water 100 gm., cognac 10 drops, sugar 2.50 gm., to be given in tablespoonful doses in twenty-four hours. Diuretin should not be given in acid mixture or with anything which like the acids precipitate the theobromine out of its solutions.

Solutions of camphor for hypodermic injections.—A solution of camphor possessing good keeping qualities and producing no abscess from the punctures is the following: Camphor 2.0, liquid paraffin 8.0 gm. The camphor is dissolved in the liquid paraffin by heating slightly.—(*Four. de Pharm. d'Anvers*, 1892, p. 54, from *Bull de la Soc. méd. Gand*.)

Preparation of carvacrol.—A. Reychler reports (*Bull. Soc. Chim.* [3] vij. 31) having obtained 90 per cent. of the theoretical quantity of carvacrol by operating as follows: Mix carvol chlorhydrate with not over 2 per cent. of anhydrous zinc chloride, and for the purpose of avoiding too energetic action, add about 30 per cent. of glacial acetic acid; heat the mixture in a flask connected with a reversed condenser. At 95° C. hydrogen chloride begins to be evolved, and it ceases near 120°. Most of the acetic acid may be recovered by crystallization, the remainder is removed with water, together with the zinc chloride; the carvacrol is separated by distillation.

For the detection of oil of turpentine in volatile oils.—L. Crismer proposes (*Bull. Soc. Chim.*) a solution of potassium acid tartrate, 20 gm., neutralized with manganous carbonate (about 6 gm.), in 1

litre of water. To apply the test 3 cc. of this solution, 5 cc. of the volatile oil and 5 drops of ammonia water are well shaken, the mixture then heated in a water bath and a current of air passed through the mixture for thirty seconds. The oils of lemon and bergamot become dark brown and oil of turpentine of an intense brown-black; most other volatile oils, if pure, acquire only a faint yellowish tinge.

Trimethylamine, administered in various ways, according to Combe male and Brunelle (*Compt. rend. Soc. biol.*, 1891), causes increased secretion and greater alkalinity of the saliva, and slight albuminuria; occasionally also vomiting and increased secretion of the nasal mucus and of tears. The local inflammation produced on hypodermic injection of the alkaloid, prevents the wound for a long time from healing.

Methylene-blue, which may be given in doses of 0.50 gm. without inconvenience, has the property of being excreted with the urine, the yellow color of which being changed to green. Constantin Paul (*Rép. de Phar.*, Jan., 1892) has proposed to the Société de Thérapeutique to utilize this property in cases where the physician wishes to assure himself that the prescribed medicine is taken by the patient. The dose is from 2 to 5 cgm. With 2 cgm. the green color of the urine is quite distinct. This property renders methylene-blue also useful in cases of melancholy and nervous derangement.

The anæsthetic properties of cocaine.—Dr. A. Bignon (*Bull. gén. Thérap.*, 1892, 170) draws attention to a few peculiarities of cocaine. In slightly acid solutions the anæsthetic property of cocaine is rendered latent, but can easily be brought to its full force by neutralizing the acid with a base. The author states that the maximum intensity as an anæsthetic is shown when "all the acid is neutralized, the alkaloid cocaine being suspended in a slightly alkaline liquid." A liquid of this kind is prepared by neutralizing the acid with carbonate, not bicarbonate of sodium. 0.05 gm. of one of the salts treated as above has the same anæsthetic power as 10 centigrammes of the pure crystalline chlorhydrate of cocaine in solution. This alkaline suspension should be prepared at the time when the cocaine is to be used; it will not keep, as the alkaloid soon collects at the bottom of the vial and cannot easily be again suspended.

The action of cocaine upon blood constituents has been studied by Professor E. Maurel, who reported to the Académie des sciences de Toulouse, Jan. 28, 1892, his conclusions. He states that in doses which do not affect the blood-corpuscles, the leucocytes are killed; this effect is produced by 0.10 to 0.20 gm. of the salt for 100 gm. of blood, equal to about 1 kilo. of bodyweight. About 0.05 gm. of the salt causes changes in the leucocytes, but their vitality is not destroyed. Doses of 0.05 to 0.10 gm. of cocaine hydrochloride, repeatedly administered, are sufficient for killing the leucocytes of from 50 to 75 gm. of blood. The death of the leucocytes may account for some of the accidents which appear after such injections.

Albumone is a new proteid isolated from blood by C. Chabrière (*Compt. rend.*, cxiii, 557), by neutralizing the serum with acetic acid, coagulating and evaporating at 100° C., extracting the residue with hot distilled water, and precipitating the solution with alcohol. Albumone is not coagulated by heat or acetic acid, and has no saccharifying action on starch; its solution is precipitated by phosphotungstic acid, mercuric nitrate, Millon's reagent and by sodium sulphate, also by ammonium phosphomolybdate on heating; the precipitate with nitric acid is readily soluble in excess, and the acetic acid solution is rendered turbid by potassium ferrocyanide.

Penghatwar-djambi, the hair like chaff of *Cibotium Barometz* is again recommended as a valuable hemostatic by Barillé (*Rép. de Phar.*, Feb. 10, 1892), and considered to be preferable to *paku-kidang*, on account of the fineness of the tubular hairs, the hæmostatic action being purely mechanical. It is very useful in epistaxis, if introduced into the nostril in form of a tampon.

Hæmostatic effects of atropine.—Dr. Dmitrieff (*Wratch*, through *Bull. gén. Thérap.* 1892, 236) used atropine hypodermically, with beneficial results, in two cases of hemorrhage, which would not yield to the usual remedies. One of the cases reported was one of uterine hemorrhage. The dose of atropine used was 0.3 mgm. for each injection.

Physiological action of Kola nut.—Drs. Monavon and Perroud (*Lyon médical*, Nov. 15, 1891), from experiments on dogs draw the following conclusions as to the physiological action of kola nut and its constituents. (1) Kola nut is rather an anuretic than a diuretic. (2) The elimination of nitrogenous bodies and phosphates is

diminished under the influence of kola nut. (3) The extract has the same action as the powdered nut. (4) Kola red has a slightly marked action on the elimination of nitrogenous bodies or of phosphates; it is similar to that of the powdered nut. (5) Caffeine has an action analogous to that of the powdered kola, but is inferior to this. (6) Kola can be regarded as a moderator of denutrition.

Physiological action of caffeine and allied compounds.—Professor Dario Baldi gives in *Terapia moderna*, December, 1891, the following summary of results obtained by his experiments: (1) *Caffeine* in small doses increases muscular excitability in dogs and frogs. (2) *Xanthine* has no action in this direction, but determines in the muscles the cadaveric rigidity almost to the same degree as caffeine. (3) *Allantoine* does not increase spinal excitability; but elevates muscular excitability in the frog, and determines cadaveric rigidity nearly the same as xanthine. (4) *Alloxanthine* does not increase either spinal or muscular excitability, and in the frog does not determine rigidity. (5) The spinal and muscular hyperexcitability, produced by caffeine, is due to the methyl groups attached to the xanthine nucleus; but the cadaveric rigidity is due to the xanthine liberated in the organism — *Revue internat.*, Feb., 1892.

Effect of pilocarpine upon milk.—Experimenting on cows, C. Cornevin observed (*Compt. rend., Soc. biol.*, 1891), that the quantity of milk is not increased by pilocarpine, but that the proportion of milk sugar is slightly augmented.

Preservation of fruit juices.—Dhamelincourt reports (*Four. Phar. Chin.*, December, 1891, p. 501) having obtained excellent results in the following way: The clarified juice is heated to boiling in a copper vessel and then poured into a dish. Meanwhile the bottles are provided with stoppers, and are then gradually filled, a space of about two centimeters in the neck being left empty; some alcohol is then poured upon the hot liquid, and the bottle is quickly stoppered, the cork being further secured as the liquid cools. The alcohol which evaporates into the empty space, is sufficient for the preservation of the liquid. The juices of *fresh herbs* may be preserved in the same manner.

Poisoning by acid potassium oxalate.—A case of attempted suicide is reported in *La Clinique*, Brussels, January, 1892, p. 33, in which the patient's life was probably saved by the large dose, 24 gm. of

salt of sorrel, which produced violent vomiting. Lime water was freely administered, and washing of the stomach and intestines with lukewarm water was resorted to; subsequently calcined magnesia was used.

Barium chloride in scrofula.—Dr. Lolli (*Arch. ital. d. pediatr.*, 1891, No. 1, through *Nouv. Remèdes*, 1892, 117) prescribed barium chloride in doses of 0.03–0.2 gm. once or twice a day for 76 children, from 2 to 12 years of age. The salt was found efficacious in gastritis of children suffering from scrofula of the torpid form; on the other hand, in erethistic scrofula it is injurious.

Injections of sublimate in blennorrhagic rheumatism—Dr. L. Arnaud (*Bull. gén. de Thérap.*, 1892, 226) uses one gram injections of the following composition in the treatment of blennorrhagic rheumatism: Corrosive sublimate 0.40 gm., sodium chloride 1.00 gm., boiled distilled water 100.00 gm. In one case reported one injection a day for nine consecutive days was given, when a cure was effected.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

Liquor Potassii Arsenitis.—The original formula of Thomas Fowler contained an addition of Spir. Lavandulæ comp. which served the double purpose of an aromatic and coloring agent. The last two editions of the German pharmacopœia disregarded this coloring addition and prescribed an aromatic, namely, Spir. Melissæ comp.; considerable dissatisfaction has been expressed regarding this preparation, since it is turbid and often becomes brown and mouldy. M. Göldner now suggests to replace the aromatic by a coloring matter; 0.005 phenolphthalein are sufficient to color 100 grams, forming a clear, red solution, owing to the alkaline carbonate present; the color is permanent, and does not interfere with the titration of the solution.—*Pharm. Ztg.*, 1892, 163.

Myrosin.—Dr. Schlicht in making determinations of myronate of potassium in rape-seed oil-cake noticed that the development of oil of mustard notably increased if the water used in the maceration of the oil-cake was slightly acidified with tartaric acid; an excess of tartaric acid diminished or prevented the formation of oil of mustard. Experiments with isolated myrosin led to the conclusion that this is a mixture, since its aqueous solution with small quantities of

tartaric acid forms a very heavy, curdy precipitate, which was insoluble in water and had no action upon myronate of potassium, while the filtrate from this precipitate retained its full power of decomposing myronate of potassium. As yet it has not been possible to produce the ferment in the pure state.—*Pharm. Ztg.*, 1892, 232.

Preservation of metallic sodium.—Liquid paraffin is recommended for this purpose. W. Vaubel has followed this method for some years, and states the formation of a brown or black crust (as in the case of preservation under petroleum) is prevented; the oil is quickly and easily removable by use of filter paper.—(*Ztschr. f. angew. Chem.*) *Pharm. Ztg.*, 1892, 233.

Inferior Castoreum.—W. Fossek describes in the *Pharm. Post* some castoreum entering commerce from Russia, which, by its appearance and putrid odor, excites attention; it does not appear to be an artificial product, but represents an abnormal, physiological natural product. An examination revealed 21 per cent. ash against 2 per cent. from good castoreum. This high percentage of ash is due to the presence of numerous globular concrements having a radiating structure and which are probably an organic calcium combination. The alcoholic extract amounted to only one-half that obtained from normal castoreum.

L. Reuter, in the *Schwz. Wochenschrift f. Chem. u. Pharm.*, 1892, 145, calls attention to the fact that commercial castoreum may give an aqueous extract having either an alkaline or a neutral or slightly acid reaction; the alkaline extracts were never found to give indications of alkaloids, while the neutral or acid extracts very frequently gave precipitates with iodine solution and platinic chloride. Reuter believes that the alkaline reaction is due to some decomposition, and recommends that such castoreum be excluded from use in medicine.

Valerian oil, according to an examination of J. E. Gerok, has approximately the following composition: Borneol valerianate, 9.54, borneol butyrate, 1.07, borneol acetate, 0.96, borneol formate 1.08, terpenes, 87.35.—*Jour. der Pharm. u. Els.-Lothr.*, 1892, 85.

Medicated cod-liver oils.—*Ferrated*: Sublimed, anhydrous ferric chloride, 3 parts, are triturated in a mortar until dissolved with 997 parts cod liver oil. Forms a red brown clear liquid containing 0.1 per cent. metallic iron. *Iodized*: Iodine 1 part is triturated with chloroform 2 parts, and cod liver oil 999 parts, added in portions.

This preparation having odor, taste and color of cod liver oil agitated with gelatinized starch should give no color. *Iodo-ferrated*: Reduced iron 2 parts, iodine 4 parts, and cod-liver oil 40 parts, are triturated in a mortar with the addition of a small quantity of ether until the iodine is chemically combined, and a black mixture results; this is then diluted with cod liver oil to make 1,000 parts and filtered; contains 0.5 per cent. ferrous iodide, and is of a red-brown color. The trituration of the iron, iodine and a small quantity of cod liver oil favors the formation of anhydrous ferrous iodide, which is readily soluble in the oil; in the older formulæ for this preparation the oil was warmed with the iodine and iron, which caused the iodine to unite chemically with the oil, leaving the iron in large part unchanged and undissolved.—*F. Weber, Schwab. Wochenschrift f. Chem. u. Pharm.*, 1892, No. 12.

Ephedra monostachya.—From the ethereal extract of the herb P. Spehr succeeded in isolating minute quantities of an alkaloid. From *Ephedra vulgaris* var. *helvetica*, *Hook. et Thomp.*, there have been isolated two alkaloids; no color reactions are known for these. The following table shows the differences between these several alkaloids:

	Ephedrine. From <i>E. vulgaris</i> .	Pseudo-ephedrine.	Ephedrine. From <i>E. monostachya</i> .
Formula,	$C_{10}H_{15}NO$	$C_{10}H_{15}NO$	$C_{13}H_{19}NO$
Melting point of the alkaloid,	210° C.	115° C.	112° C.
the chlorhydrate, . . .	216° C.	174° C.	207° C.
Solubility in water, . . .	difficultly	1:454	} very easily
Alcohol,	} easily	very easily	
Absolute ether,		1:15	
Ether,		1:24	
Benzol,		1:26	
Chloroform,		1:8	1:11
Petroleum-ether,	{ very difficultly	almost insoluble	1:13750
Taste,	bitter, astringent		{ burning anæsthetic
Action,	{ strongly poisonous; mydriatic		} almost inert
Form of crystals of the alkaloid,	{ rhombic prisms		monoclinic
the chlorhydrate, . . .	rhombic		hexagonal

Adulterated cod liver oil.—J. Bienert reports a case of adulteration in which vaselin oil (liquid paraffin) was present to the extent of 95 per cent.; the 5 per cent. cod liver oil was of inferior quality. —*Pharm. Ztsch. f. Russl.*, 1892, 204.

The action of a concentrated sodium salicylate solution (1 + 1) upon phenols and phenol derivatives has been investigated by A. Conrady. *Fluid extract of cascara sagrada* will mix clear with this solution, and can then be diluted with water in all proportions. *Carbolic acid* will also readily dissolve in it, and is then miscible with water in all proportions; a solution containing 80 per cent. carbolic acid no longer acts as a caustic if placed upon the skin. *Creasote* will also dissolve in any proportion; a mixture of equal parts of creasote and sodium salicylate solution has a syrupy consistence and can be made into a good pill mass by addition of powdered glycyrrhiza; these pills have the advantage that they remain soft for a long time and that the *creasote cannot be pressed out mechanically*. Menthol, thymol, etc., show similar solubility; the volatile oils also are soluble in this solution, but owing to their variable chemical composition not in all proportions. Experiments are being made to see if this behavior will allow of a method for the examination of essential oils. —*Pharm. Ztg.*, 1892, 180.

The action of ferrous iodide upon starch and filtering paper.—The purplish red coloration which a solution of ferrous iodide assumes upon limited exposure is traceable to the presence of starch in the filtering paper; neither cellulose nor starch are colored by a solution of ferrous iodide, but the presence of atmospheric oxygen liberates iodine, and this then forms with the starch a deep red compound decomposable by water into blue iodide of starch. The starch in the paper is due in most cases to the presence of unruptured cells; in occasional cases to imperfect treatment with alkali and water since the starch granules are not found in the original cells, but loosely attached to the fibres. The solution of ferrous iodide during filtration must dissolve the starch and later upon exposure there is produced the deep red coloration.—Th. Salzer, *Chem. Ztg.*, 1892, 421.

Ichthyol, in 3 to 10 per cent. solutions, has been used by Dr. Pellegrini (*Brit. Med. Jour.*, 1891) locally in the pustular stage of the eruption in small-pox; suppuration was checked, drying up was hastened, and pitting was prevented.

A GENERAL LAW APPLICABLE TO GASES AND LIQUIDS.

BY J. ALFRED WANKLYN.

One of the results flowing from the work upon which I have been engaged for many years, sometimes alone and sometimes in company with my colleagues, Cooper and Johnstone, is the unfolding of a great generalization, applicable alike to gases and liquids, which may be formulated in the following terms:

Heterogeneity is without influence upon volume, or the volume of a mixture is equal to the sum of the volumes of its constituents separately measured.

Gases.—So far as I am aware—although the reasoning on the simplest examples of gas analysis involves the admission of the truth of this generalization as applied to gases—the generalization has never been explicitly set out.* It is not by any means manifest *a priori*, but is founded upon very wide observation.

Thirty-one years ago it fell to my lot to place on record in the *Trans.* of the Royal Society of Edinburgh, a series of observations illustrative of the great truth that gaseous mixtures occupy exactly the same volume as the constituents of the mixture.

The paper has been frequently quoted, because in that paper Sir Lyon Playfair and myself announced the discovery of the duplicate nature of nitric peroxide, which is N_2O_4 at low temperatures and NO_2 at high temperatures. The completeness and the striking character of the evidence bearing upon the fundamental nature of gaseous mixtures has, however, escaped attention altogether, and it will not be out of place to refer to it in a detailed manner. The paper bore the title "On a Mode of Taking the Density of Vapor of Volatile Liquids at Temperatures below the Boiling-point," by Dr. Lyon Playfair, C.B., F.R.S., and J. A. Wanklyn, F.R.S.E., and it was read January 7, 1861.

The method consisted in measuring the volume occupied by a mixture of a measured quantity of a permanent gas, and an ascertained weight of the vapor under investigation; and our paper contained a detailed proof that such mixtures have the same volume as the sum of their constituent volumes, measured separately. We proved this for mixtures of alcohol and hydrogen, for mixtures of ether and hydrogen, for mixtures of nitrate of ethyl and nitrogen, for mixtures of nitric acid and air, and lastly, for the

extreme case of a mixture of gaseous ammonia and gaseous water.

This last case I consider to be most important and most decisive. The details are, "a quantity of dry ammonia was measured over mercury, then a small portion of water, which had been accurately weighed in a thin glass bulb, was introduced into the ammonia. The whole was then heated up to 100° C., and the volume of mixed gas and aqueous vapor noted.

	Observed cc.	T.°	P. mm.	Corrected vol. at 0.6 and 760 mm.
NH ₃	39.19	12.5	558.08	24.008
NH ₃ + H ₂ O	107.32	102	709.66	72.973

The weight of water employed was 0.0402 grm. On calculation it will be found that 0.0402 grm. H₂O yields 49.95 cc. at 0.6 and 760 mm., whilst the experiment gave 48.965 cc., which, bearing in mind the experimental difficulties of such an experiment, is a sufficiently close agreement. In short, there is the most varied evidence that, so long as there is no actual chemical action between the molecules by a gaseous mixture, the fact of the molecules being dissimilar has no influence upon the volume."

Liquids.—The law holds in the instance of liquids just as in the instance of gases. Such, I believe, is the fair interpretation of the results which have been recently published in the *Chemical News* and in the *Philosophical Magazine*.

In July last Cooper and myself published the preliminary result that a strong solution of cane sugar occupies the same volume as the solid sugar and water of which it is composed, and set down 0.371 as the value of *i*, the increment co-efficient of cane-sugar.

In the November number of the *Phil. Mag.*, an elaborate investigation is published. Employing a half-litre specific gravity bottle, and taking great precautions, and covering a wide range, viz., from 1.3 grms. up to 104.6 grms. of sugar in a litre of solution, we obtain a slightly higher value, viz:

Strength, i.e., No. of Grms. of Sugar in Litre of Solution.	Sp. gr.	<i>i</i> .
1.341	1000.52	0.3878
9.878	1003.84	0.3887
104.580	1040.60	0.3882

Over this wide range it would seem that *i* is absolutely constant. When the strength is greatly increased, at 749.5 grms. per litre, for

instance, i has been found 0.3762. Such a solution is quite viscid, and the slight depression in the value of i is no doubt due to the departure from perfect fluidity.

The account which we give of the solution of cane-sugar in water is as follows:

Up to, and no doubt considerably beyond, a strength of 105 grms. sugar in the litre, these sugar solutions are mixtures of fluid sugar (specific gravity 1.634) and water; and they have exactly the same volume as the water and sugar, measured separately. Very strong and viscid solutions—which, in truth, are not quite perfect solutions—exhibit a very slight departure from absolute uniformity. They are mixtures in which the density of the sugar is a little lower, viz: 1.606, which has been recognized as the density of solid sugar. On calculation it comes to this, that in passing from the liquid to the solid state there is a slight expansion, viz: about one-fiftieth. In the viscid solution we find the slightly expanded sugar; but in the dilute and more fluid solutions the fluid sugar is found with its density 1.634.

There is similarity and dissimilarity between saline solutions and solution of sugar. Similarity, inasmuch as i is fairly constant over a great range of strengths in both cases; dissimilarity, since—whilst sugar solutions exhibit no marked contraction—saline solutions show a very decided contraction. In the sugar case $i - i_s = 0$, but in the saline case $i - i_s = C$; and C has a considerable magnitude.

The view which we take of saline solutions is that they are mixtures of fluid hydrates with water, and that the fluid hydrate simply diffuses into the water, or mixes with the water, without changes of volume of any kind.—Chem. News, March 11, 1892, p. 122.

IMPURITY IN CHLOROFORM.¹

BY D. BROWN, F.C.S.

Statements have been made which ascribe injurious effects to impurities in chloroform, but I am not aware of a single instance where these effects have been traced to their presence. In the absence of reliable information regarding the chemical or physiological action of the substance other than chloroform which are

¹ From Phar. Journal and Transactions, March 19, p. 769.

produced with it, such statements can only be based on theory. It cannot, however, be denied that all chloroform is not so free from impurity as it should be, and a recent examination of commercial samples shows that in some cases there is great room for improvement.

The purity of chloroform cannot be determined by any one test; those of the Pharmacopœia enable us to ascertain its purity up to a certain point, but beyond that there has been no attempt made to insist on a purer preparation, or to provide means by which smaller quantities of impurity not recognized by the P. B. tests may be detected and separated.

Before giving a process for recognizing and separating impurities passed over by the P. B. tests, I would like to point out that these impurities have boiling points both above and below that of pure chloroform, that as a rule they possess very strong characteristic odors which even in a very dilute form can be more readily detected by the nose than by any known chemical reagent, and further that if the impurities found in chloroform are dangerous to life, there is a greater likelihood of the more volatile ones doing mischief than the less volatile, seeing that the former will evaporate and be inhaled with the chloroform, while the latter are to a very large extent left behind when the chloroform has evaporated.

At present no process is known by which the total impurity in chloroform can be determined. By careful fractional distillation, however, and dividing the sample under examination into two fractions, one of 10 per cent., the other of 75 per cent., and a residue of 15 per cent., we obtain both the more and less volatile impurities in a concentrated form. Unfortunately we can only say of the 10 per cent. fraction that it does not in a greater or less degree possess the smell peculiar to impurity; we can also say of the 15 per cent. residue, and in addition collect and weigh the bulk of the non-volatile impurity by slowly evaporating, with precautions to exclude dust, at a temperature of from 80° to 90° F.

I do not claim that the result obtained by this process give the total quantity of impurity present in the sample, but I think they are of considerable comparative value, and enable us to reject inferior chloroform, which at present passes the Pharmacopœia standard.

Seven samples of commercial chloroform, which were found to

answer all the P. B. tests, were treated in the manner just described, and gave the following results:

TABLE I.

No.	10 p. c. fraction.	15 p. c. residue.	Residue at 80-90° F. Parts by weight.
1.	No bad smell	No bad smell.	1 pt. in 1,946,100
2.	" "	" "	I " 487,500
3.	" "	" "	I " 487,500
4.	" "	" "	I " 487,500
5.	" "	" "	I " 390,000
6.	" "	" "	I " 121,875
7.	" "	" "	I " 243,750

It is evident from these results that the P. B. tests permit a preparation containing sixteen times more impurity than is found in one, and four times more than we obtain from others, to pass into the market and take its place there on an equality with them. They also—and I consider this a very important point—supply material which proves that chloroform of equal purity can be, and is prepared from other substances than duty paid alcohol, for the second, third, and fourth samples were prepared—not specially, but in the ordinary course of manufacture—from alcohol, acetone, and methylated spirit, and are found to be practically identical.

Six other samples, some said to be of P. B. purity, and others laying claim to chemical purity, were subjected to the same treatment as the preceding seven, and gave results as under:

TABLE II.

No.	10 p. c. fraction.	15 p. c. residue.	Residue at 80-90° F. Parts by weight.
1.	Bad smell	very bad smell	1 part in 57,352
2.	" "	no bad smell	I " 324,999
3.	Very bad smell	very bad smell	I " 243,750
4.	Slight "	bad smell	I " 121,875
5.	" "	" "	I " 324,999
6.	" "	" "	I " 390,000

None of the above samples in their original form were found to answer the P. B. tests, but the ordinary consumer would pass the bulk of them as of P. B. purity; he could not fail, however, to detect the bad smell either in the residue or the 10 per cent. fraction, which points, I think, to the absolute necessity for some more exacting test being provided.

This process, which may be considered an extension of the present bad smell and residue tests of the P. B., requires about 130 cc.

of the sample, and from two to three days for each experiment, but I have no doubt the time could be shortened.

It is not advisable to raise the standard of purity beyond the possible reach of manufacturers, but I think chloroform intended for anæsthetic purposes should be expected to stand more exacting tests than those of the present Pharmacopœia.

The temperature at which 85 per cent. of each sample distilled over were noted; the average range of the finer ones was 165°C . and that of the less pure 204°C which gives a difference of 0.39°C . in favor of the purer preparations; this is a small difference, and as some of the bad samples distilled over below the average range of the finer ones, I am inclined to think that the boiling point is not of much value for detecting impurity in commercial chloroform.

THE CHEMISTRY OF DIGESTION AND OF THE GASTRIC JUICE.

BY HAYENS AND WINTER.

The work of these authors, who have introduced some modifications in the method of testing the gastric contents, has excited a good deal of attention and discussion. It may, therefore be useful to give a summary of it, abstracted from *L' Union Médicale*, Nos. 134, 135 and 136. They use the following method, which they believe to be very exact in its results. The gastric fluid is filtered and then divided into three portions, each of 5 ccm., which is placed in three capsules, *a*, *b*, *c*. In capsule *a* an excess of carbonate of sodium is introduced, and the three are then dried in a water bath: afterwards *a* is carried to commencing redness, the contents being frequently stirred, and the heat is discontinued when there are no longer any points of ignition, and the mass becomes sticky. After cooling, distilled water is added, and a little pure nitric acid in excess; it is then boiled to drive off the carbonic acid, and a slight excess of carbonate of soda added to produce slight alkalescence, so that the indicator used in testing may react more sharply. The precipitation of the calcareous salts indicates that the limit is attained. After filtration and washing the residue with boiling water, the liquids are added together and the chlorine is estimated by decinormal solution of nitrate of silver (using chromate of potassium as the

indicator). The figure found, expressed in hydrochloric acid, represents the total chlorine T contained in the original liquid.

b is left on the water bath for an hour, then an excess of carbonate of sodium is added, and it is evaporated afresh and tested for chlorine, as above.

The figure given by b represents all the chlorine less the free hydrochloric acid, $a - b = \text{HCl free}$. After drying c it is carefully calcined, avoiding all super-elevation of temperature. After cooling, the chlorine is tested, as above, and the figure for fixed chlorine is obtained; $b - c$ equals the chlorine combined with organic matters and ammonia.

(1) T (the total chlorine) undergoes very regular variations at different hours of digestion. At the first period it increases, the increase, however, not being proportioned to the time; the duration of the period depends upon the kind of animal, on the individual and the nature of the food. Whatever the kind of food, the phenomenon is more rapid the lighter the meal is. During the first hour it is the greatest. The maximum of chlorine is found in the second hour when a light meal is taken (a quarter of a litre of tea and 60 grammes of bread), but it is retarded when lighter food is taken. Afterwards the chlorine decreases more or less rapidly.

(2) Chlorine fixed (F). This may arise from the food or the secretions. In the former case a maximum figure is found at the beginning; in the second case it will increase unless it is transformed by digestion; there would then be other chlorine combinations. The second is actually what occurs. When water is introduced into the stomach of fasting dogs its digestion is accompanied by a rapid increase not only of the total chlorine but of the fixed chlorine. When both solids and liquids are given, digestion may be divided into two periods. In the first, the total chlorine increases more rapidly, and the fixed Cl tends towards a certain limit, about which it oscillates. Later, the total chlorine arrives at its maximum, and diminishes, whilst the fixed chlorine rises, and undergoes consequently an inverse variation to that of the total chlorine. At the beginning of digestion the total chlorine preponderates very much over the fixed, and the difference is so much the greater as the food is more solid. This difference depends besides on individual conditions.

(3) Free HCl , designated by the letter H , often fails in the gastric

liquid, and, when it exists there, its proportions are very irregular. We cannot, therefore base clinical researches on the dosage of the free HCl.

(4) Organic combined hydrochloric acid (C). Its variations are very regular, and when the test meal is mixed they go on parallel to those of the total chlorine. When distilled water has been given, C increases very little, or remains almost nil.

(5) The acidity (A) is always very much greater than the free HCl in the normal digestion of man; further, it is very near the sum of $H + C$,—that is the free HCl and combined organic hydrochloric acid. This fact favors the supposition that the gastric liquid is acidified by combined HCl. After a mixed meal, in the dog, the maximum acidity corresponds to the maximum of the chlorine elements, but the decrease of the acidity is less rapid than that of those elements; there are, therefore, at the end of digestion other acid elements than free HCl and combined organic Cl elements, whose nature is not known.

Hence it is a great mistake to consider the total acidity as due essentially to free HCl, for (1) this acid often fails; (2) hydrochloric acid may be combined with organic albuminoid matters; (3) organic acid may be present; (4) there may be a small quantity of phosphates. The quantities 1, 3, and 4, represent only the smallest part of the acidity, of which the greater part is due to hydrochloric acid combined with organic matters in solution; (4) if into the juice of meat obtained by expression, and already acid, we pour a known quantity of not too strong HCl, at the end of a very short time the color reactions of the latter are no longer produced, the liquid evaporated at 100° or 110° no longer allows HCl to escape. MM. Hayens and Winter think that the albumen dissolved in the gastric juice is found in the state of hydrochlorate of an amido acid of the general formula $R < \begin{smallmatrix} \text{NH}_2 \text{HCl.} \\ \text{CO OH.} \end{smallmatrix}$

If we admit that the combined HCl exists in the gastric juice in the form of salts of amido acid, the total acidity A of the gastric juice, less the free HCl (H) ought to be equal to the combined HCl (C) when there is another acid present. That is to say, we should have $\frac{A-H}{C} = 1$. This relation a will be greater than 1, when, beside hydrochloric acid, organic acids are present, it will be less than 1

whenever the combined HCl is not exclusively in the form of hydrochlorates of amido acids (chloride of ammonium hydrochlorates of organic acids destructible by heat). In man, in the physiological state, the proportion a is pretty constant.

To sum up, the stomach is, during digestion, the seat of chemical phenomena, evolving themselves in a regular manner. The rapidity of this evolution is so much the greater the simpler the food and the more it accords with the digestive capabilities of the particular animal. It shows itself by the variations in the chlorinated elements, among which free HCl (H) is, from the quantitative point of view, much the most feeble; whilst, on the contrary, the combined organic chlorine (C) presents itself as the most important figure to consider in the appreciation of the useful work furnished by the stomach for a definite mixed meal.

When we make several analyses of the gastric juice in the same animal under different conditions we find the results very constant. This constancy of the factors indicates that they are all the factors active in intra-gastric digestion. F (fixed chlorine) ought to be regarded as a secretion, or at the least as the direct product of the elements secreted under the influence of the simple excitation produced by distilled water. But F and its factors do not suffice to peptonize albuminoid elements, and multiple agents intervene in the digestive act. At the beginning of the physiological digestion of a mixed meal, F does not tend to rise above a certain scarcely variable limit, therefore Na and Cl are utilized in another form for the elaboration of the foods during this period. But in the pathological state F may increase or decrease much; we may consider that due to, either an insufficient use of the chlorine elements secreted, or an insufficient secretion. That is to say, in the pathological state the fixed chlorine is not used in the normal manner, and that may be attributed to increase or diminution of other agents. Whatever the form in which the fixed chlorides are utilized their chlorine is always comprised in the total chlorine T; the chlorine may therefore serve to measure the chlorhydric secretion, and T is an important value; all things being equal it varies but little in the physiological state, but may vary with the kind of test meal employed.

The utilization of the fixed chlorides makes itself evident during digestion by the increase of the HCl combined or free; $H + C$ (that is, the free hydrochloric acid and the organically combined HCl) is

the algebraic expression of the power of chemical reaction of the stomach. This sum is called "chlorhydric" by the authors. The important part, as we have already seen, belongs to C in a test meal composed of solids and liquids; it remains then small or nil. In healthy man after a test meal there is always a certain quantity of free HCl, and all things being equal that quantity varies little, and its relation to C is constant. This constancy of the sum $H + C$, and of the relation H to C in normal conditions ought to serve as the basis for the examination and classification of pathological liquids.

The presence of H is not indispensable to a normal digestion, perhaps it is useful as an antiseptic; its absence ought not to be considered as abnormal, because it may disappear according to requirements and enter into immediate communication with albuminoid matters.

Albuminoid matters, in order to become peptones, form first, hydrochloric combinations; HCl results from a reaction on the spot, and in order to ascertain the quantity of HCl, useful or utilizable ($H + C$), we must first test the total chlorine and the fixed chlorine. To test the amount of peptonisation it is necessary to ascertain the quantity of organic chlorine compounds (C) and $H + C$; we thus obtain an indirect measure of the peptones, because the quantity of peptones formed is directly proportional to the intensity of the digestive reactions. Generally, raised amounts of C correspond to very distinct biuret reactions; when H is very high, C remaining normal or feeble, the biuret reaction is also very strong.

A—that is, the total acidity and the free HCl + the combined organic HCl—have a pretty close equivalence, which is explained by the existence of amido-acids in the gastric juice. In the pathological state numerous exceptions to this law of equivalence are found. In fact, a certain number of conditions may cause the acidity to vary, for instance, the nature of the food or abnormal fermentations of the contents of the stomach. The variations of α make the value and the course of these alterations perceptible.

The authors think that chloride of sodium intervenes directly in the primordial act of peptonisation. "Free HCl is only then a production consecutive and secondary to total peptonisation." Starting from this point they instance the constancy of F during all the maximum digestive period and the increase of this value due the secondary phase. The components of F (Cl and Na) each play

their part, and, their work ended, again return to the primitive form of NaCl. According to this hypothesis, as long as there is albumen to digest, this NaCl regenerated, recommences the same cycle, till all food being digested it becomes useless. Thus a minimum quantity of chlorine may suffice for the transformation of a considerable quantity of albuminoid matter. The figures below are the averages of different values obtained at the end of one hour. They are expressed in milligrammes of HCl in man, and relate to 100 ccm.

Total acidity, A = 189 per 100 (may oscillate and be still normal from 180 to 200).

Total chlorine, T = 321

Fixed chlorine, F = 109

Combined chlorine, . . . C = 168 (varies from 155 to 180).

Free HCl, H = 44 (varies from 25 to 50).

H + C = 212

The average figure for *a* is 0.86, and varies from 0.86 to 0.92.

The authors use Ewald's test meal. They give the meal in the morning, and in case there is any suspicion of the stomach not being empty, it is first washed out, and the meal given one hour and a half to two hours later. When the liquid is extracted its quantity, color, and odor are noted, and it is then allowed to settle, when the different layers and their character are noted. The liquid is next filtered, and if it contains much mucus it passes through very slowly. The latter is examined from a small portion of the upper layer before filtration, a small quantity of the liquid is used for testing for pepsin and the color reactions.—*The Medical Chronicle*, April, 1892, p. 30-34.

THE RELATION OF GEOGRAPHY AND MATERIA MEDICA.

By E. M. HOLMES, F.L.S.

Curator of the Museum of the Pharmaceutical Society of Great Britain.

During the last few years my attention has been repeatedly drawn to the necessity for a more accurate and more widely spread knowledge of the geographical sources of drugs. The importance of this knowledge is thoroughly recognized by Hanbury and Flückiger in "Pharmacographia," where the districts in which drugs are produced are very carefully and precisely laid down. In drug brokers' lists also the port from which a drug arrives and the ship which carries

it are usually stated. When a drug in a list is marked "per land carriage," every wholesale buyer knows that the sample needs careful inspection, and that it may or may not be correctly named. But if a parcel of *Parcira Brava*, instead of being marked "Rio Janeiro" is marked "Bahia," both cities being in Brazil, or if a parcel of cubebs instead of being marked "Java" or "Batavia" is marked "Singapore," the difference of two or three hundred miles in the geographical source of the drug is not allowed sufficient consideration. It does not seem to be generally understood that the flora of one country, or even of one district within a distance of one or two hundred miles or even less, may differ very considerably from another. The result is that drugs constantly find their way into commerce from new districts, differing considerably in properties and value from the official article. These may also pass into use and into retail trade, and it is only when the patient notices a difference in the color and taste, or the physician observes an unlooked-for or defective result, or the chemist finds a difference in the working of the preparation, that the fact of a genuine drug not being used is discovered. This very unsatisfactory state of things requires a remedy. The difficulties which beset the conscientious pharmacist who desires to supply the physician with reliable preparations of a strength as uniform as possible are numerous enough. The period at which a drug is collected, the care which is taken in drying and packing it, the age of the plant itself, and the climate and soil in which it is grown, are all factors which tend to cause variation in strength.

The difficulty of ascertaining the geographical source of a drug is, however, one that might be easily met by the framers of the Pharmacopœia.

In that work the geographical source of the drug is given in comparatively few cases. With "Pharmacographia" to fall back upon, there is no reason why the Pharmacopœia should not limit the geographical sources of drugs *intended for use in medicine* by mentioning the countries or districts from which they may be obtained. It would then be possible for chemists to specify by name the drug required, just as it is customary to order Jamaica or Cochin ginger, Bengal or China turmeric, or Natal or St. Vincent arrowroot. The simple use of the letters P. B. after the name of a drug would then in any case be sufficient basis for a legal action if the definition of

the Pharmacopœia were not complied with. The way in which the absence of this specification in the Pharmacopœia works out in practice, may be seen in the following instances:

Coca.—The variation of cocaine in its effects has long been known to physicians, but only within the last two or three years has it been assumed that the poisonous action (*Pharm. Jour.* [3], xxi, p. 162) may be due to the isotropyl cocaine (*Pharm. Jour.* [3], xxi, p. 1109), which is said to be contained more especially in the variety *Novo-granatense*, Dyer. It becomes important, therefore, that the district or country from which the best variety of the leaves is obtained, should be stated in the Pharmacopœia, so that the preparations used may thus be rendered as uniform in character as possible.

*Cubeb*s.—For some years past, owing to the scarcity of genuine cubeb, a spurious kind has been frequently offered in commerce. This kind, which is distinguishable by its mace-like odor and taste and by not giving a crimson color with strong sulphuric acid was found to cause poisonous symptoms. Dr. M. Treub informs me that this spurious cubeb is not produced in Java, which is the chief geographical source of the genuine article. If the locality for genuine cubeb has been given as Java in the Pharmacopœia, this substitution would obviously have been avoidable.

Copaiba.—A few months since an article was imported under this name from West Africa. It was found by Mr. J. C. Umney, (*Pharm. Jour.* [3], xvii, p. 449) to possess in many respects physical and chemical properties similar to those of the genuine drug, but no one who has compared the taste of the two drugs or of the preparations made from them would be likely to consider them identical. Yet the retail chemist who judged the article by the appearance alone, might easily be misled. The Pharmacopœia gives no geographical source for balsam of copaiba, so that in the absence of any evidence to show that it was not produced by "any species of *Copaifera*," it might be legally admissible, though it might differ in physiological action.

Jaborandi.—When Pernambuco jaborandi was first introduced I pointed out that some of the articles in commerce appeared to consist of the leaves of *P. Selloanus*, a native of Southern Brazil. Makers of the alkaloid pilocarpine soon found out that there was a considerable difference in the percentage contained in different

samples of the leaves. The weaker drug proved on examination to be derived from *P. Selloanus*, and to be imported from Rio Janeiro. The difference in strength of the leaves of these two plants might easily cause considerable inconvenience, both to patients and medical men, when preparations from different leaves were used in succession. The official article should be limited to the Pernambuco kind.

Nux Vomica.—In the paper by Messrs. Dunstan and Short (*Pharm. Jour.* [3], xv, p. 157) on *nux vomica* seed it was shown that considerable variation in alkaloidal strength characterized the seeds obtained from different countries, and that consequently standardization was necessary. In this case a geographical limitation of the source of the seeds to be used in medicine might result in greater uniformity of the preparations made. (See *Am. Jour. Phar.*, 1883, 467).

Pareira Brava.—The great similarity in general appearance of the roots and stems of menispermaceous plants favors the substitution of spurious roots for the genuine *Pareira Brava*. A few years ago a root appeared in the London market, bearing a very strong resemblance to the genuine drug, but having narrower concentric rings. On inquiry it was found to have come from the banks of the Congo, in West Africa!

About the end of the year 1890 another spurious variety entered into commerce. This differed from the genuine, not only in the narrower concentric zones, but also in its much lower specific gravity. On tracing its source it was found to have come from Bahia, in the north of Brazil, instead of from Rio Janeiro, much further south, whence the genuine drug is imported. This substitution has formed the subject of an investigation by Messrs. Ringer and Brooke, which has already appeared, and of a microscopical investigation by W. M. Holmes (see the present number). These show that while similar to the true drug in the alkaloid it contains, it is not identical with it, and is inferior to it in every respect. Such substitutions of one drug for another may lead to the loss of confidence in the genuine drug. It is obvious that in the case of this drug also, an explicit limitation of its geographical source by the Pharmacopœia would be an advantage.

Strophanthus.—The absence of a limited geographical source for this drug in the additions to the Pharmacopœia has led to the importation of seeds from the Caboon, Gold Coast, Niger Territory,

etc. The use of seeds which are the product of different plants can hardly fail to throw discredit upon a drug which has been proved to possess definite and valuable physiological properties, for the varieties in commerce have not shown to possess the same strength or even the same active principle as the original drug.

White Hellebore.—The most recent instance that has come before me of the importance of a knowledge of the geographical distribution of plants is that of *Veratrum album*.

A root was offered in considerable quantity as white hellebore, which it was supposed to resemble. The microscopical and physical characters of the root indicated that it belongs to the comparatively harmless natural order *Scitamineæ*, instead of to the poisonous tribe *Colchicææ* of *Liliaceæ*. The disappointment that would have awaited the agriculturist who might have purchased the powder and the chagrin of the chemist when some analyst had proved that the powder was not white hellebore, may be easily imagined.

In conclusion, I would point out that the arrival of a drug from an hitherto undescribed geographical source should invariably lead to a suspicion of its genuineness, and a special examination of its properties and quality by those who purchase it. The instances brought forward indicate that in every case limited geographical sources, if mentioned in the Pharmacopœia, would lead to greater uniformity in medicinal preparations.

THE MICROSCOPICAL CHARACTERS OF A SPURIOUS PAREIRA BRAVA FROM BAHIA.¹

BY W. MURTON HOLMES.

In the year 1873 the late Daniel Hanbury pointed out, in a paper communicated to the *Pharmaceutical Journal* (*Amer. Jour. Phar.* 1873, p. 449), that the *Pareira Brava* then in general use was not the produce of *Cissampelos Pareira*, Linn., as stated in the British Pharmacopœia, and that neither the stem nor root of that plant resembled any forms of the drug he had ever met with. This was first pointed out in the "Pharmacopœia of India," 1868. This confusion as to the true source of the drug had lasted for more than

¹ From *Pharmac. Jour. and Transactions*, April 9, p. 829, where drawings of the vascular bundles of true pareira brava and of the Bahia drug are shown.

a hundred years. He established beyond doubt that the drug which was first brought to Europe from Brazil by Portuguese missionaries in the seventeenth century, and which appears to have been that upon which the reputation of *Pareira Brava* was originally founded consisted of the root of *Chondodendron tomentosum* (Ruiz et Pav.). Nothing was known of the botanical origin of the commercial drug, which was possessed of a certain amount of medicinal activity, beyond the fact of its belonging to the natural order Menispermaceæ, but even this variety had become rare, and was being replaced by a drug completely devoid of medicinal power.

Since the publication of the original paper the true drug has come again into general use and was made official in the British Pharmacopœia, 1885. The stems of chondodendron frequently appear in commerce mixed with the root. The confusion that had reigned so long was not dissipated all at once, and from time to time parcels of spurious pareira make their appearance in the market. The structure of the wood of various menispermaceous plants shows a great similarity, so that it is not much to be wondered at if other species are occasionally offered as the true drug. By a careful comparison, however, of the characteristics of genuine pareira the substitution may be detected.

In a paper on "The Relation of Geography and Materia Medica," Mr. E. M. Holmes draws attention to a spurious variety of *Pareira Brava* from Bahia, which entered into commerce about the end of 1890. At his request I had already undertaken to examine the microscopical characters of this drug, and to see if it were possible to point out any differences of practical value, by which pharmacists might with tolerable certainty recognize the spurious from the genuine drug. Mr. Holmes has furnished me with the following particulars concerning the history of the drug.

"The *Pareira Brava* sent to you came to this country under somewhat peculiar circumstances, for a knowledge of which I am indebted to one of the leading firms of London drug brokers. Towards the end of the year 1889 a consignment of bird skins came from Bahia, in the north of Brazil, the cases being filled in with pieces of wood, some of which were sent to the brokers for inspection. This 'turned out' to be *Pareira Brava*. The whole of the wood, about two hundredweight in all, was packed in a case and readily sold at a public sale for 100s. This price evidently pleased

the shippers, for they set to work and cut all they could and flooded the market. Fair prices were obtained until January, 1890, when it dropped to 98s; in March and April to 95s., 90s., and gradually down to 25s. in October, 1891, there being about 100 bales still on hand. The trade in general have purchased parcels of this article, and appear to be quite satisfied with the results. Most of the wholesale druggists consider it to be genuine. It has been consigned from two different firms from Bahia. It is very interesting to note that the genuine *Parcira Brava* from Rio Janeiro is generally exported in wicker-work cases, technically known as baskets, and that the different mode of packing does not seem to have raised any suspicion of a possibly different geographical source in the minds of the buyers. The last occasion on which I noticed a spurious *Parcira Brava* in the market was in 1886. The article then examined came from the Congo State (see Kirkby, *Pharm. Journ.* [3], vol. xvii, p. 218). Like the spurious kind now under consideration, it bore a strong resemblance to the genuine root in its external appearance, being of a dark, nearly black color with interrupted transverse ridges or scars, and being rowed or striated longitudinally. Both the Congo and the Bahia roots can, however, be easily distinguished from the genuine by the more woody and narrower zones, the medullary rays being consequently thinner than in the genuine root. Most of the pieces are also much lighter in weight than the genuine drug, so much so as to be easily perceived when the root is held in the hand. I have little doubt that you will find such microscopical differences in structure as may be expected to occur in roots so strongly resembling each other as those of different menispermaceous plants."

The drug above referred to consists of pieces both of stem and root.

Stem.—As seen in transverse section the stem has a small but well marked medulla, composed of round and oval cells somewhat smaller than the medullary cells of the same size of chondodendron. Some of these cells contain starch granules and others numerous small crystals (apparently octahedral and probably calcium oxalate). Scattered throughout the medulla are numerous groups of sclerenchymatous cells with evident canaliculi, and with the central cavity almost obliterated. The layers of thickening are very distinct. There is not the same gradual transition of the cells of the medulla

into the medullary rays that obtains in chondodendron. Immediately surrounding the medulla is an almost continuous zone of thickened cells, the cavities of which are blackened by treatment with iodine. These cells are more numerous at the apex of each of the wedge-like woody bundles. The medullary rays are narrow, composed of tabular cells elongated in a radial direction, which dividing at the end and meeting a corresponding division from the next ray overlap the bases of the woody wedges in the same manner as in true Pareira. The wedge-shaped woody bundles in the zone immediately outside the medulla are much shorter than in chondodendron, and the succeeding zones are arranged much more uniformly. They are composed of thickened wood-cells and are perforated by numerous large vessels, the cavities of which are frequently filled by secondary growths. Outside the first zone of woody bundles there is a layer of sclerenchyma composed of polygonal cells with numerous and well marked canaliculi. This is broken at intervals by crescent-shaped patches of thickened prosenchyma (bast) which are more conspicuous than the similiar structures in chondodendron. The layer of sclerenchyma has conical projections opposite the medullary rays, which fill the spaces left by the bifurcation of the latter.

In the stem of true pareira there is a considerable amount of parenchyma outside this layer, composed of cells elongated in a tangential direction, and this also obtains with the cells in the middle of the large medullary rays, whereas in the spurious variety now under investigation the woody bundles of each successive zone begin almost close up to the sclerenchymatous layer. This, I consider, may be a distinguishing mark of some value. The remaining zones are each surrounded by a continuous layer of sclerenchyma. Starch is present to about the same extent as in the stem of chondodendron, but a decoction of either gives only a rusty-red color with iodine. The cells of all the parenchymatous tissue contain numerous small, apparently octahedral crystals, which might be mistaken for starch granules unless tested with iodine. A longitudinal section shows numerous vessels, with thickening distributed in oval patches, gradually passing into reticulated fibres. These vessels have numerous prolongations from their walls meeting similar prolongations from contiguous vessels. The large vessels of the woody bundles are pitted with numerous slit-like markings, arranged in a spiral

manner. The wood fibres themselves present similar markings, and some with bordered pits also occur.

The microscopical structure of the stem of chondodendron was very fully described by John Moss, in a paper published in the *Pharmaceutical Journal*, March, 1876.

Root.—A longitudinal and tangential section of the roots, both of the true and spurious pareira, shows that the woody bundles are arranged in an open network. Dotted and reticulated vessels, with lateral prolongations similar to those in the stem, are abundant in both kinds, and are especially evident when the sections are not perfectly exhausted of air. In a transverse section the cavities of the pitted vessels in the woody bundles of the root of chondodendron are seen to be not more than half the diameter of those in the stem. This is an important character. Starch is much more abundant in the root of true pareira than in the stem. All the parenchymatous tissue, even that considerably thickened by secondary deposits, is full of it. The granules are mostly compound, but not of large size. Crystals, apparently octahedral, are also present. The root has much the same general structure as the stem, as far as the distribution of the woody bundles is concerned.

On comparing a section of the root of the spurious pareira with a section of the root of chondodendron I find the following differences:

(1) The vessels in the woody bundles of the spurious are about twice the diameter of those in true pareira.

(2) The sclerenchymatous tissue outside each zone is more conspicuous.

(3) The bases of the woody wedges are concave. In true pareira they are nearly straight.

(4) The mass of parenchyma at the base of the wedges is in consequence nearly circular.

(5) The spurious pareira contains only a few scattered grains of starch.

(6) The medullary rays are narrow in the spurious variety, and the cells are elongated in a radial direction. In true pareira they are broad, and the central cells elongated transversely. They are also loaded with starch granules.

(7) The zones of the spurious are more regular in size, and the number of woody wedges is greater. The point from which the wedges radiate is very eccentric.

For purposes of ordinary examination it is only necessary to make a clean section of the drug with a sharp knife or razor, and examine the cut surface with a good lens; but when a thin section is required for more detailed examination under the microscope, a piece should be soaked in water for a day or two. It is then comparatively easy to make a thin section, which should be stained in the usual manner.

TRUE AND COMMERCIAL PAREIRA.¹

BY F. A. RINGER AND E. BROOKE.

Some time ago Mr. E. M. Holmes, the Curator of the Society's museum, informed us that he had a sample of a substitute of pareira which had recently come into the market in large quantities, its botanical origin being unknown. At his recommendation we determined to investigate the chemical characters of this root, and compare the results with those obtained from the roots of *Chondodendron tomentosum*.

Examining these preliminarily we noticed that the genuine root cut like very hard wax, whereas the spurious one when cut crumbled into pieces. The powder of the true *pareira brava* is also much lighter in color, but heavier bulk for bulk than the substitute.

The cooled aqueous decoction of the latter drug will not give any coloration when treated with iodine, and, therefore, does not answer the Pharmacopœia description in this respect.

The amount of moisture in the two roots was practically the same, both drugs being dried at a temperature of 110° C. In the case of chondodendron it amounted to 9.30 per cent., and in the substitute to 8.99 per cent. of the whole weight.

The total ash was next estimated, and was found to be 4.29 per cent. in the original drug, and in the substitute 1.32 per cent. When chemically and spectroscopically examined the same metallic and acidulous radicals were found in each. This result was confirmed by repeating the experiment on two other portions of the drugs. The metallic radicals present were iron, aluminium, calcium, sodium and potassium, whilst the acidulous ones were phosphates, sulphates and silicates. The root of chondodendron, exhausted by petroleum

¹ Read before the School of Pharmacy Students Assoc.; reprinted from *Phar. Jour. and Trans.*, Feb. 27, p. 703.

ether and the percolate evaporated to dryness in a current of air, yielded a large residue of a dark color which had two or three small, roughly defined crystals scattered through it. This residue had a melting point of 47° C. It was then treated with absolute alcohol, the solution yielding on evaporation a dark amorphous fat, which floated on the surface, and a number of crystals like small cauliflower heads which formed at the bottom of the vessel. These crystals were recrystallized several times, the melting-point then taken, and a weighed quantity of both the crystals and the fat neutralized by a centi-normal soda solution. From this it was found that the total residue, which amounted to 8.67 per cent., consisted of seven-eighths of free fatty acid, mainly stearic, the remaining eighth being a neutral liquid oil, which was obtained in too small a quantity for further examination.

The percolate from the substitute was of a light yellow color and after evaporation left a much smaller residue, amounting to 0.28 per cent. This residue was acid to litmus, but being in too small a quantity to determine the fatty acid present, we assumed it to be near that of palmitic; if that assumption be correct, then half the residue estimated volumetrically would be fatty acid.

The marc left from the two previous percolations was then dried at the ordinary temperature, exhausted with ether and the percolate evaporated to dryness.

Practically nothing resulted from this treatment in the case of chondodendron; but the false drug gave a residue to which a trace of volatile oil probably adhered, as evidenced by a strong, peculiar odor.

This residue, which occurred to the extent of 0.24 per cent., was insoluble in water and dilute sulphuric acid, did not answer the tests for gallic and tannic acids and gave no precipitate with Mayer's reagent. It was tasteless, melted on the application of heat and dissolved in solution of caustic potash with the production of a dark color. Being acid to litmus and freely soluble in absolute alcohol, it was considered to be an acid resin.

The residues left from the previous ether percolations were dried and exhausted with absolute alcohol, the percolates measured and a known quantity evaporated to dryness, then incinerated and the ash deducted. This gave the total amount of organic solids present, soluble in absolute alcohol.

The remainder of the alcoholic percolates were evaporated to dryness, the resulting residues digested in water and the mixture filtered. The solutions thus obtained were then divided into two parts (A and B) and a definite portion of A evaporated to dryness to ascertain the amount of the organic solids soluble in water. The remainder of A was tested for tannin and alkaloids, both of which were found present in the drug.

The second part (B) was then concentrated and neutralized with sodium carbonate until no further precipitate ensued, the precipitate being then dried and exhausted with ether. The ethereal solutions evaporated to dryness and weighed gave the amount of alkaloid present.

The aqueous filtrate after precipitation was neutralized with acetic acid and then treated with acetate of lead, as recommended by Dragendorff, but no results worth mentioning were obtained by this method. The residues from the previous treatment with alcohol, after being dried, were exhausted with water, the percolates measured, and certain portions evaporated to dryness.

From this was ascertained the total solid residue, which amounted in the case of chondodendron to 11.76 per cent., and in the substitute to 6.05 per cent.

About 10 cc. of the percolates were then mixed with twice their volume of absolute alcohol and allowed to stand for twenty-four hours, when a large precipitate occurred in the liquid obtained from the genuine drug, showing that a large quantity of mucilaginous substances were contained in it. The percolate from the substitute showed scarcely any precipitate.

Percolations were also made with dilute soda solution and dilute hydrochloric acid, but they were not carried far enough to put the results in this paper.

The following table will show the results of our analyses by this process as far as we have conducted them :

ANALYSES.		
	Per cent. from True.	Per cent. from False.
Moisture (110° C.),	9.30	8.99
Ash (containing Fe, Al, Ca, Na, and K, also phosphates, sulphates and silicates),	4.29	1.32
Fats and Fatty Acids (petroleum ether extract), . .	8.67	0.28
Acid Resin (ether extract),	none	0.24

ANALYSES.—*Continued.*

			Per cent. from True.	Per cent. from False.
Alkaloid	} Extracted by	{	0·819	0·143
Tannin, etc.		{ absolute	1·261	2·497
Phlobaphene		{ alcohol.	0·52	0·53
Mucilaginous and Albuminous Substances (ex- tracted by water),			11·76	6·05
Substances extracted by Soda (0·1 per cent. solu- tion),			none	none
Starch, Lignin, Cellulose and non-extractive mat- ter (by difference),			63·38	79·95
			<hr/> 100·00	<hr/> 100·00

We think from these results the conclusion may safely be drawn that the root of chondodendron is much richer in chemical and extractive principles than the substitute.

The root of chondodendron gave 13·67 per cent. and that of the substitute 9·73 per cent. of extract. These extracts were made with boiling water, as directed in the Pharmacopœia, and were thoroughly dried at a temperature of 110° C. These figures show that the true root affords a much larger yield of extract than the substitute.

In the meantime, whilst these analyses were proceeding, we extracted the alkaloid by another method. The drugs were reduced to the finest powder possible and 100 grammes of each taken and thoroughly exhausted in the cold with 1 per cent. solution of sulphuric acid; then a solution of sodium carbonate was added to the percolate until a precipitate ceased to form. We noticed that in the case of chondodendron the precipitate left off forming when the solution was exactly neutral, whereas in the substitute it continued forming long after neutrality was reached. This precipitate was thoroughly dried, then digested with successive portions of ether until nothing else was dissolved, and the ethereal solution evaporated and weighed. The alkaloid was thus obtained in a nearly pure state, and was present to the amount of 0·840 per cent. in the true root, and 0·166 per cent. in the substitute, thus nearly corresponding with the results obtained in the previous analyses. The filtrates after the previous precipitation were evaporated to dryness and the residues digested in ether, but practically nothing was dissolved by this treatment.

In purifying these alkaloids it was found that on filtering alco-

holic solutions through or digesting them in charcoal, the alcohol only passed through the filter leaving the alkaloid behind. They were separated again by digesting the charcoal in dilute sulphuric acid, and then precipitating with ammonia or sodium carbonate.

The alkaloid isolated by this method from the true root was at first of a white color, but on drying changed to a light yellow. It was amorphous, and did not readily melt at 145° C., although a change occurred at that temperature. When heated strongly in a dry test tube it melted, charred and swelled up, giving off a strong, peculiar odor which somewhat resembled that obtained from beberine.

The alkaloid from the false was of a somewhat darker color than that from the true and on drying still further darkened. The melting-point of this was not taken on account of the small quantity obtained for experiment. It also was amorphous.

Both alkaloids were insoluble in water, but freely soluble in absolute alcohol and ether.

The following experiments were made on both alkaloids:

COLOR REACTIONS.

False.	Reagent.	True.
Dirty green changing slowly to brown, finally to slate color.	Fröhde's.	Brownish-green changing to light-brown.
Red-brown, remaining so.	Nitric acid.	Vandyke or black-brown becoming lighter.
Slight green tint, then deep brown.	Sulphuric acid.	Light brown.

The alkaloids were then converted into the hydrochlorides and eventually with great difficulty were obtained in a partially crystalline form by slow evaporation from alcohol. Both salts were similar, the crystals being needle-shaped and very small.

They were then converted into the platino-chlorides, which seemed to resemble one another very closely, being both amorphous and of the same color, almost insoluble in cold and sparingly soluble in boiling water. The melting point of the platino-chloride from the true was 242° C., whilst that obtained from the substitute was 221° C.

We do not think these melting points can be taken as indicating

different alkaloids, as the salts were prepared in a slightly different manner, but we are inclined to think after summing up the previous results that both drugs contain the same alkaloids. These alkaloids doubtless require further investigation, and we intend to more fully examine them and give the results obtained in a future paper.

In conclusion, the chemical difference between the two roots may be summed up as follows :

The substitute contains much less ash, less mucilage, less alkaloid, a much smaller proportion of fats and fatty acids, a small quantity of an acid resin, no starch, and affords a much smaller quantity of extractive matter.

NUTMEG CULTIVATION IN JAMAICA.

In the *Bulletin of the Botanical Department of Jamaica* for October last, it is stated that a large stock of the very finest nutmegs for seed has been imported to Jamaica from Grenada, and has been sown in the Hope Gardens, and, when ready for distribution, will be sold at the very low rate of three halfpence each, in large or small quantities. It is hoped that these arrangements will tend to develop the planting of nutmegs on a large scale in suitable districts in Jamaica. It is stated that already one order has been filed for 10,000 plants, and another for 5,000. The germination of the seed in large quantities, and the care of the seedlings, is said to require the strictest attention, to prevent extensive loss. From the seed bed, the seedlings are transferred to bamboo pots, and, when they have quite recovered from the transplanting, and have formed good roots, they are ready for the nutmeg plantation. The planters must now exercise strict supervision over the laborers, to see that the bamboo pot is carefully slit down on one side, and the plant, with the earth undisturbed round the root, gently placed in the hole prepared for its reception. If this operation is done too harshly or clumsily, the tip of the tap root is broken, and the plant soon dies.

Nutmeg trees require a deep, rich, loamy soil, moist but not swampy, with a humid atmosphere. They thrive best in steady river valleys from sea-level up to 300 or 400 feet, but they will grow in favorable situations up to an elevation of 2,000 feet. The trees should be placed at distances of 25 or 30 feet apart, and if the situation is not naturally shady and sheltered, trees should be planted for

the purpose of breaking the wind as well as for shade. The trees are a long time coming to maturity, not producing a crop, as a rule, till they are nine years old; and only when they first flower, at six or seven years of age, is it possible to determine whether they are male or female. A very small proportion of male trees is left for fertilization by insects; the rest are cut down and fresh plants are substituted. The fertile trees continue to produce for seventy or eighty years. On an average, each tree will yield 10 pounds of nutmegs and about 1 pound of mace every year; and, when highly manured, it is said that they will produce ten times that amount.

In connection with the same subject, a note on the curing of nutmegs in Grenada is given in the November number of the *Jamaica Bulletin*, the details of which may be of service to those who are starting the culture. The process is said to be that which is adopted for preparing the nutmegs for the London market. The nutmegs are picked up from under the trees every day except Sunday. On being brought into the boucan, the mace is peeled off and pressed flat between heavy blocks of wood, where it is left for two or three days, then put into a case and left till it reaches the proper color. The nutmegs are put into receptacles (with fine mesh bottoms so that the air can pass through), inside the boucan, and left there for three weeks or a month, in fact until the nut begins to shake inside the shell. They are then shown the sun for a couple of hours a day for two or three days. After this they are cracked. Great care is necessary here, for if the outside shell is struck too hard it makes a black spot in the nutmeg, which affects the value considerably. When cracked, the nuts are sorted according to size, put into ordinary flour barrels and shipped. Regarding the value of the produce of nutmeg trees when in full bearing, it is stated that one grower in 1883 realized from two trees as much as £30.—*Journal of the Society of Arts; Phar. Four. and Trans.*, Feb. 13, 1892, p. 656.

Compound Elixir of Iodine is the name suggested by Wm. Pepper, M.D. (*University Med. Magaz.*, Feb., 1892, p. 376), for a preparation made by dissolving phosphorus, $\frac{1}{100}$ grain, and iodine and bromine, each, $\frac{1}{2}$ grain, in one drachm of simple elixir. It has been used with considerable satisfaction in cases of torpid circulation with subacute gastric catarrh, and of subacute bronchitis with a relaxed and atonic state of the system. An elixir of balsam or of white pine may be used as the solvent, to which the name of *Compound elixir of pine* might be appropriate.

MINUTE OF MEETING OF COLLEGE.

PHILADELPHIA, March 28, 1892.

The annual meeting of the members of the College was held this day at 4 P. M. Charles Bullock, President, in the chair. Seventeen members present. The minutes of the last stated meeting were read, and on motion adopted. The minutes of the Board of Trustees for January, February and March, were submitted, and by resolution approved.

As is usual at this meeting the reports of Officers, and of Standing Committees were called. The chairman of the Committee on Publication made brief statement referring to the prompt issuance of the Am. Journal of Pharmacy, during the fiscal year just closed. The editor of the Journal submitted the following :

"Respectfully reporting that within the past year the Am. Jour. of Pharm. has published 110 original papers, exclusive of abstracts, gleanings, varieties, editorials, reviews and other matters especially prepared for that publication. This is larger than any annual contribution since the year 1877, and it is worthy of particular note that one-third of this number of papers treat of galenical preparations, dispensing conveniences, and other practical subjects. Increased interest in the Pharmaceutical Meetings is shown by the fact that 38 papers were read during the past year exceeding by two the number presented during the year 1887-'88. Abstracts from 36 theses were published and nine members of the College contributed 35 papers. The total number of authors was 72. The sincere thanks of the editor are tendered to all who have aided him in his labors by contributing their observations for publication and he bespeaks for the Journal a continuance of such friendly interest and co-operation. It should be noted that a very complete general index for the *ten* volumes of the Journal from 1881 to 1890 was prepared during the past year, and furnished to the members of the College."

The Librarian reports that upwards of 100 works on the various subjects germane to Pharmacy have been received since the last statement, 40 volumes of which have been received from two members of the College.

The Curator states in his report that the museum is overcrowded, and the space insufficient and suggests that the herbarium specimens be mounted in hinged frames after the style of the specimens of the Smithsonian Institution at Washington, D. C.

Upon motions duly seconded the above reports were accepted and directed to be transcribed upon the minutes.

The following preamble and resolutions were presented, the resolutions being passed upon, adopted and approved seriatim and afterwards adopted as a whole :

WHEREAS : The Board of Trustees of this College have in contemplation the erection of a new building on the Tenth Street front of the College property.

THEREFORE—*Resolved* : That the College approve of the erection of said building whenever the plans for the same shall have been approved by the Board of Trustees.

Resolved : That the Board of Trustees be, and hereby are authorized to borrow such an amount of money as may be necessary for the erection and completion

of said building, giving as a security for the same a lien on the real estate of the College.

Resolved: That the proper officers of this College are hereby authorized, and directed to affix their signatures to such mortgage, or other security as may hereafter be directed by the Board of Trustees of this College, for the purpose of securing a loan to defray the cost of the erection and completion of said building, together with the contemplated alterations in the present building.

Resolved: That authority is hereby given to affix the seal of the College, to such mortgage security as the Board of Trustees may direct for the above purpose.

An election for officers of the College for the ensuing year being ordered, the following were unanimously chosen.

President—Charles Bullock.

First Vice-President—Robert Shoemaker.

Second Vice-President—William J. Jenks.

Treasurer—William B. Webb.

Corresponding Secretary—A. W. Miller, M. D.

Recording Secretary—W. B. Thompson.

Librarian—Thos. S. Wiegand.

Curator—Jos. W. England.

Committee on Publication—H. N. Rittenhouse, J. T. Shinn, Thos. S. Wiegand, Chas. Bullock, John M. Maisch.

Editor—Prof. John M. Maisch.

Trustees for 3 years—Robt. England, Prof. S. P. Sadtler, Prof. John M. Maisch.

Prof. Maisch referred to the death of Prof. Theophilus Redwood, of London, a distinguished name in the honorary list of members of this College. This event occurred on the 5th of the present month.

On motion meeting adjourned.

WILLIAM B. THOMPSON,
Secretary.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Philadelphia College of Pharmacy.—The examinations of the junior students during the past term were on the following subjects:

BOTANY AND MATERIA MEDICA.

(1) Explain in a general way the *conditions* favorable for the *formation of cells*. In what manner are the *marks* produced upon the *walls of dotted cells*? What are *bordered pits*?

(2) Give descriptions of *parenchyma cells* and some of their varieties. What kinds of cells are found in *fibrovascular* tissue, and what are the characteristics of each kind?

(3) Describe the arrangement of *fibrovascular bundles* in the stems of *monocotyledons* and *dicotyledons*. Explain the difference between *open* and *closed* *fibrovascular bundles*.

(4) Define *Root* and *Rhizome*, and give of each examples of officinal drugs.

How would you distinguish between a root and rhizome by external characters and by structure?

(5) Define *Levant wormseed*. Describe the drug. Name its active principle and state the behavior of this principle to different solvents, and the effect of light upon it. Give the doses of *Levant wormseed* and of its principle. How would you distinguish *Levant wormseed* from *American wormseed*?

(6) Name one officinal herb of each of the following orders: *Papaveraceæ*; *Violaceæ*; *Gentianeæ*; *Labiataë*; *Urticaceæ*. Also give for each the most important principle or principles.

THEORY AND PRACTICE OF PHARMACY.

(1) Define specific gravity and state the weight in grammes of 555 cubic centimetres of sulphuric acid of the specific gravity of 1.84.

(2) Describe three forms of pharmaceutical apparatus for producing heat, each requiring the combustion of a different substance, one solid, one liquid and one gaseous. State the uses, advantages and disadvantages of each one that you describe, and illustrate each one if possible by a sketch.

(3) Define the process of solution. What is meant by circulatory solution? Define the term solvent. Name five solvents used in pharmacy in the order of their importance, stating what class of substances each solvent is used for.

(4) Define colation and filtration, elutriation, levigation and pulverization by intervention.

(5) In what respect do oleoresins differ from fluid extracts? Give the general official formulas for making infusions, decoctions and fluid extracts.

(6) Name three official liquid preparations each made by passing a gas into water. Give in each case the official process and describe the apparatus used in making the preparation.

CHEMISTRY.

(1) What is meant by the latent heat of fusion? Give an example of this. How is this principle illustrated in freezing mixtures? Give an example of a freezing mixture. What is meant by the latent heat of vaporization? Give an application of this principle.

(2) What is frictional electricity? What is voltaic electricity? State points of difference between the two. Mention some of the common forms of voltaic batteries. State which are to be preferred and give your reasons for this choice.

(3) Describe the element Iodine. From what source is it obtained? What are its compounds with the metals called? Write the chemical formulas for three such compounds. Point out the chief physical and chemical differences between the several elements of the halogen group.

(4) Write the chemical formulas for: Hydrogen Oxide, Potassium Chloride, Sodium Sulphide, Magnesium Chloride, Zinc Oxide.

Give the chemical names for: MgBr_2 , Cl_2O , Fe_2Cl_6 , MnO_2 , FeCl_3 .

(5) Write in chemical symbols the formulas for: Ammonium Nitrate, Basic Calcium Nitrate, Neutral Sodium Carbonate, Potassium Chlorate, Acid Potassium Sulphate, Sodium Thiosulphate.

Write the proper chemical names for: $\text{H}_2\text{S}_2\text{O}_7$, NaClO , $\text{Mg}_2\text{P}_2\text{O}_7$, NaHSO_3 , $\text{Na}_2\text{B}_4\text{O}_7$, KNO_2 .

(6) Describe the element Phosphorus, stating both physical and chemical properties. Give the formulas of the several oxygen acids of Phosphorus, and give an example of a salt of each acid.

EXAMINING COMMITTEE.

(1) What is the origin of the Sulphur of commerce? In what forms is sulphur found in the shops? Give the Latin names of the officinal varieties: What impurities are these varieties respectively liable to contain? Why is water of ammonia used in making one of the officinal forms of sulphur?

(2) What is meant by the specific gravity of solid substances? Mention two methods of ascertaining the specific gravity of liquids. State how you would determine the specific gravity of a crystal of rock candy. What is the lightest substance known?

(3) Give the formulas respectively of Sulphuric acid, Sulphurous acid, and Thiosulphuric acid. Give the tests for sulphuric acid.

(4) Each Compound Cathartic Pill U. S. P. contains

Compound Extract of Colocynth, gr. 1'3

Abstract of Jalap, gr. 1.

Calomel, gr. 1.

Gamboge, gr. '25.

Write out a formula expressing in metric weights the quantity of each ingredient necessary to make one hundred pills.

OPERATIVE PHARMACY.

The candidates prepared Sodii salicylas (granulated), Massa hydrargyri and Pilulæ catharticæ compositæ.

SPECIMENS.

Cetraria,	Aqua Anisi,	Aqua Chlorig,
Lavandula,	Hydrarg. c. Creta,	Potassii bicarb.,
Lobelia,	Tinct. Gentianæ co.	Sodii chloridum.
Sambucus,		

The examination of the senior students commenced March 26, and terminated March 31. The subjects were as follows:

MATERIA MEDICA AND BOTANY.

A—Rhubarb—Where and from what plants is rhubarb obtained? What part of the plant is used, and how is it prepared for the market? Explain the structural characteristics of the drug. To what is the grittiness of rhubarb due? Name the important organic constituents of the drug. State the effect of alkalies upon these principles. How does rhubarb, cultivated in certain localities in Europe, differ from the pharmacopœial drug? Give the doses of rhubarb when used as a tonic, aperient or purgative. How may turmeric be detected in powdered rhubarb?

B—Male Fern—From what plants is this drug obtained, and where are they indigenous? Describe the drug as seen in the market. Explain the arrangement of the tissues. In what respect does the drug differ as obtained from the plants recognized by the pharmacopœia? What portion of the drug is directed for use by the pharmacopœia? Name the principles present in male fern, and state to which one the medicinal properties of the drug are regarded

to be mainly due. What is the dose of the drug, and of its pharmaceutical preparation? Name some other (non-pharmacopœial) drugs obtained from ferns, and state their medical uses.

C--Barks of Lauraceæ—Name the pharmacopœial barks obtained from plants of the order of Laurineæ, and state in each case the botanical name and habitat of the plant; whether (and if so to what extent) any portion of the tissues of the bark is usually removed; the characteristic structure of the bark; the medicinally or pharmaceutically important principles; the chief proximate constituent of the volatile oil; and the influence of nitric acid or other oxidizing agent upon the volatile oil.

D--Buchu—Name the plants and their habitat from which buchu leaves are obtained. Describe the different commercial varieties of the drug. Which tissue of buchu leaves contains mucilage? What other parts of the plants are sometimes mixed with the drug, and what is their medicinal value? What other leaf is sometimes substituted for long buchu, and how may it be distinguished from the latter? Give the percentage and characteristics of the volatile oil of buchu. State the medical properties and dose of buchu leaves. Name some other drugs from the natural order yielding buchu, and state their medicinal properties.

E--Arbor vitæ—Name the plant, its habitat and the part directed by the Pharmacopœia. Describe the drug. Name its constituents and their properties. What are the medical properties and dose of the drug? Name the officinal volatile oils obtained from coniferæ. State from which drugs these volatile oils are distilled. Give their chemical composition.

F--Hops—Name the plant, its habitat and the part used. Describe the drug, specifying the arrangement and character of its various parts. From which portion of hops is *lupulin* obtained? How is lupulin collected? Explain its structure. Name the constituents of lupulin. Also the constituents of hops deprived of lupulin. What effect has exposure to the air upon hops and lupulin?

G--Seeds—Name the pharmacopœial seeds containing albumen (perisperm) and a straight embryo, and give in each case the botanical name and habitat of the plant; the structure of the seed; the important proximate constituents, with the average percentage of each; also the chemical nature of these constituents, and the characteristic reactions of some of them.

H--Asafetida—Name the plants yielding asafetida, and give the habitat of each. From which part of the plants and by what process is asafetida obtained? Describe the drug. What impurities are usually met with in the commercial drug, and in which portion of it? State the effect of alcohol, ether and water upon asafetida. Name the proximate principles and the percentage of each. What is the chemical composition of the characteristic odorous principle? Give the medical properties and dose of asafetida.

I--Insects—Name the officinal insects, and the order to which each belongs. How are these insects collected? Give the size, shape and color of each kind of these insects. Name their important constituents. Give the behavior of the valuable constituents to simple solvents and to alkalies. What impurities are sometimes met with in the commercial insects, and how may such impurities be detected?

K—Which pharmacopœial drugs yield valerianic acid when distilled with water?

What effect has treatment with caustic potassa upon: (a) Oil of Cloves; (b) Resin of Scammony; (c) Turmeric.

How would you detect the following adulterations: (a) Musk with dried blood; (b) Oil of Peppermint with Oil of Turpentine; (c) Saffron with Calendula.

THEORY AND PRACTICE OF PHARMACY.

A—How many grammes of official Tincture of Nux Vomica would be required to make four troy ounces of dry Extract of Nux Vomica?—A bottle when filled with official syrup, contains 23.58 av. oz.; how much official nitric acid will it contain?

B—Give the unabbreviated official or Latin name, the ingredients, and brief outline of process, and describe the appearance of gray powder; blue ointment; red precipitate; black draught; yellow wash; brown mixture; white precipitate, and green soap.

C—Give the English name and synonym, the ingredients, and brief outline of process, and describe the appearance of Mistura Ferri et Ammonii acetatis; Liquor Potassii arsenitis; Decoctum Sarsaparillæ compositum; Syrupus Scillae compositus; Tinctura Benzoini composita; Massa Ferri carbonatis; Acidum nitro hydrochloricum, and Vinum Ferri amarum.

D—Describe briefly the processes for preparing Ethyl oxide; Ethyl acetate, and amyl nitrite; and give of each the official name, the medical uses and the modes of administering.

E—Give three methods for obtaining volatile oils. Illustrate, either by a sketch or a written description, the modes of separating heavy and light oils from water whilst using one of the common methods for obtaining volatile oils.

F—Describe the chief characteristics of alkaloids. Give the principal reason for the use of the salts of an alkaloid in preference to the alkaloid itself. Name three liquid alkaloids obtained from official drugs. Name five official preparations obtained from official drugs containing liquid alkaloids.

G—Describe three methods of making suppositories. What is the best base for making suppositories? Give the reasons for the preference.

H—Criticism and correct the following prescriptions, if necessary, stating what difficulties there may be in compounding and dispensing them, and how they would be remedied:

Rx	Rx
Chinin. Sulph., gr. x.	Iodide Pot., ʒiiss.
Morph. Sulph., gr. ⅙.	Hydrarg. Bichloridi, grs. ii.
Dent. tal. dos. No. iv.	Alcohol, ʒss.
	Elix. Calisaya, ʒiiss.

I—Examine the following prescriptions, and, if you would dispense them, state the proper method, explaining the difficulties, if any exist, and give the quantity of finished preparation in each case:

R

Quin. Sulph., ℥ ii.
Tr. Opii camph.,
Syr. Pruni Virg.,
Glycyrrhiza, āā ℥ ii.

SIG.—A dessertspoonful every 3 hours.

R

Ferri et Quiniæ cit.
Ammon. Carb., āā ℥ i.
Sp. Ammon. Arom., ℥ iv.
Tinct. Opii, ℥ ij.

Aquæ, ad ℥ viij.

SIG.—One teaspoonful 3 times a day.

K—Criticism and correct the following prescription, if necessary, stating what difficulties there may be in compounding and dispensing them, and how they would be remedied :

R

Acid Nitro Muratic, ℥ ij.

Tr. Gent. Co.,

Tr. Cincho Co., āā ℥ iss.

Courcao, ℥ j.

Ext. Taraxaci, ℥ i.

Fluid Ext. Rhei, ℥ ij.

Tr. Cardamom., ℥ j.

Dose.—2 teaspoonfuls 3 times a day.

CHEMISTRY.

A—State the occurrence and several methods of production of Nitre. What are its chief chemical and technical uses? In what respects does it differ from Chili Saltpeter? Where can this replace Nitre to advantage and where can it not do so?

B—Describe the metal Aluminum. State the sources and methods by which it is at present obtained. Enumerate any important alloys obtained from it. What are the technical uses of Aluminum and its alloys?

C—Describe the oxides of Mercury, both officinal and unofficinal. How are they obtained? Give the chemical formulas of the several chlorides, iodides, sulphides and sulphates of Mercury. Give both the common and the exact chemical names for each of these compounds.

D—What is the composition of "Chrome Green," of "Chrome Yellow," of "Chrome Red," of "Red Lead?" What is the composition of "Prussian Blue," of "Ultramarine Blue," of "Paris Green?" State tests by which the identity of each of these colors can be established.

E—Give the exact chemical formulas for :

Calcii Hypophosphis,

Ferri Hypophosphis,

Calcii Phosphas Præcipitatus,

Sodii Phosphas,

Sodii Pyrophosphas,

Zinci Phosphidum.

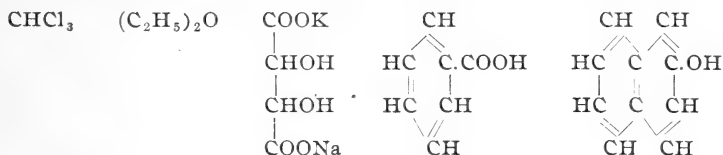
F—Write the graphic formulas of normal propyl alcohol and isopropyl alcohol. In what respect do they differ? Show by formulas the different effect of oxidizing agents upon these two alcohols. Name the products of oxidation obtained from each.

G—What are the sources of Tartaric Acid? How is it extracted and purified? Give the chemical formulas of Salt of Tartar, of Soluble Tartar, of Tartar Emetic, and of Rochelle Salt.

H—Enumerate some of the important industries based upon the alterations of Starch and the utilization of these products of alteration. Write the chemical reactions for the production of these compounds from Starch. What are the chief commercial sources of Starch? How is it extracted from these?

I—What reactions will enable you to distinguish between a Glucoside and an Alkaloid? Mention several Glucosides which have active physiological power. Mention several Glucosides yielding officinal substances among their decomposition products. Mention several Glucosides from which important natural dyes have been obtained.

K—Give both chemical and common names for the following compounds :



COMMITTEE OF EXAMINATION.

A—Give the botanical name of the plant from which Nux Vomica is obtained. Which part of the plant constitutes the official portion? Name the two chief active constituents of Nux Vomica. Name another official drug which contains the same alkaloidal constituents. What are the medicinal properties of Nux Vomica? What is the ordinary dose of its most important alkaloid? Into what official preparations does this alkaloid enter? What strength of menstruum is directed for all of the official preparations of Nux Vomica? Name the official preparations of Nux Vomica, and give the dose of each.

B—Give the official names of, and the ingredients (omitting quantities), entering into Syrup of Iodide of Iron; Syrup of Senna; Syrup of Senega; Syrup of Hypophosphites, and Syrup of Tar.

C—Write the prefixes by which the metre is increased; also the prefixes by which the litre is diminished. If a litre of official alcohol be placed upon one arm of a scale beam, and a half litre of official Glycerin, in a container of the same weight, were placed upon the other arm, how many cc. of water would be required to establish a balance, and into which container must it be put?

D—What is the chemical formula of Benzoic acid? By what chemical tests is benzoic acid distinguished from Salicylic acid? Give the chemical formula of sodium salicylate. How may salicylic acid be separated from this salt? Give the most characteristic test for salicylic acid. Describe two methods for the quantitative determination of Glucose. Describe how you would detect starch in an organic mixture.

E—Give the official title and the source of yellow wax; Cantharides; Isinglass; Spermaceti, and Osgall. Name an official preparation into which each substance enters.

F—What official organic acid is obtained by the destructive distillation of wood? What per cent. of absolute acid does the stronger official acid contain? How is the presence of empyreumatic substances determined? How is Chloroform made from a salt of this acid? Give a name which will express the chemical composition of Chloroform, and give the formula in symbols. Under

what names is Chloroform official? Name two official preparations of Chloroform. What liquid does the United States pharmacopœia use to preserve it? What per cent. of absolute Chloroform does the purest official form contain? What is the effect of light upon Chloroform?

G—Name the active principles of the following drugs: State whether they are alkaloids, glucosides, resins, etc., and give a good solvent for each principle; Podophyllum, Santonica, Pilocarpus, Piper, Sinapis, Opium.

H—If the following prescription was received by you, and consultation with the writer was impossible, what would be the proper course to pursue in dispensing it? Write a correct label for it:

R. Strych. sulph.,
Sodii arseniat., gr. j.
Ferri reduct.,
Quin. sulphat., āā gr. xxxij.
M. Ft. Pil. No.

SIG.—“I Q. S $\frac{1}{32}$ As. $\frac{1}{16}$.”

One after each meal. Copy on box.

Criticise this prescription; write it out properly, substituting official names, avoiding abbreviations, and translate the directions.

R. Quin. disulph., gr. xl.
Cinchonin bisulph., gr. xxx.
Morph. chlor. hyd., gr. ij.
Ext. dat. stram., gr. v.
M. Ft. Pil. No. xx.

S.—Pil. una et rept. in hor. quat.

I—How would you prepare this prescription? Would you dispense it?

R. Menthol., gr. xxxvi.
Ac. boric.,
Sodii borat., āā ʒ ij.
Glycerin.,
Aq. acidi carbolici, āā fʒ iv.
M. Sec. art.

SIG.—Use in atomizer.

Criticise this prescription, and state how you would compound it.

R. Rhei,
Ext. cascaræ, āā ʒj.
Aloin.,
Ext. nucis vom., gr. v.
M. Ft. mass. et div. in pil. No. xx.

SIG.—One at bedtime.

K—Write correctly, using full official names, a metric prescription to contain the following ingredients:

R. Blue pill, two hundred centigrammes.
Powdered opium, two decigrammes.
Watery extract of aloes, two and a quarter grammes.
Make into twenty pills.

SIG.—Take two pills at bedtime.

How would you compound this prescription? Would you dispense it as written?

R. Strych. sulph., gr. j.
 Ferri et potass. tart., ʒ vi.
 Syrup. zingiber., f ʒj.
 Aq. menthæ., q. s ft. f ʒij ss.
 M. Sec. art.

S.—Teaspoonful three times daily.

SPECIMENS.

Belladonnæ rad.	Aq. Cinnamoni.	Acid sulphurosum.	Chenopodium.
Conii fruct.	Cerat. Cantharidis.	Alumen.	Kino.
Hydrastis.	Extract. Pruni virg. fl.	Antim. Sulphidum.	Matricaria.
Guaiaci lignum.	Infus. Digitalis.	Aqua Chlorig.	Oleum Lini.
Lavandula.	Linim. Chloroformi.	Potass. bicarbonas.	Xanthoxylum.
Physostigma.	Mel Rosæ.	Potass. bitartras.	Ferri sulph. exsic.
Rhus glabra.	Mist. Amygdalæ.	Sodii bicarbonas.	Liniment. Calcis.
Sassafras medulla.	Pil. cathart. comp.	Sodii boras.	Liq. Ferri chlor.
Stramonii fol.	Spir. Ammon. arom.	Sodii chloridum.	Syr. Rhei arom.
Ulmus.	Syr. Tolutanus.	Zinci sulphas.	Tinct. Arnicæ flor.

OPERATIVE PHARMACY.

Syrup.

Potass. Iodid.,	gr. xxxj.
Potass. Hypophosph.,	gr. j.
Acid. Tartaric.,	gr. xxviiij.
Aq. Dest.,	f ʒj.
Alcohol. Dilut.,	f ʒij.
Syrupi q. s. ad	f ʒiv.
M. Ft. Syrupus Acidi Hydriodici Decolor. N. F.	

Emulsion.

Make four fluid ounces of a 50 per cent. Emulsion of Codliver Oil with water, using equal parts of dextrin and acacia to emulsify the oil, and give the exact formula used.

Pills.

Myrrhæ,	gr. xxij.
Sodii Carb.,	gr. xij.
Ferri Sulph.,	gr. xij.
Syrup,	q. s.
M. Make 15 Pills—coat with silver leaf.	

Lozenges.

Bicarb. Sodium,	75 gr.
Powd. Tragacanth,	15 gr.
Powd. Sugar,	200 gr.
Water,	q. s.
Make 15 Lozenges.	

Suppositories.

Tannic Acid,	3 gr.
Ext. Stramonium,	3 gr.
Cacao Butter,	100 gr.
Make six Suppositories by rolling, without moulds.	

Eleven (out of twenty) candidates with the grade very satisfactory were present at the examination in histology and for the purity of drugs, the specimens in the former branch being the cuticle of the leaf of illicium, transverse section of the stem of ailanthus, tangential section of the wood of sassafras, and transverse sections of cloves, cimicifuga (rootlet), Ceylon cinnamon, fennel, Jamaica quassia, Para sarsaparilla and veratrum. In the second branch the specimens consisted of African saffron (carthamus), Indian bdellium, cubebs with unripe rhamnus fruit, galangal, fruit of *Illicium religiosum*, Bombay mastic, root of *Polygala alba*, *santonica* with American worm seed (*chenopodium*), Alexandria senna (consisting of leaflets of *Cassia acutifolia* and *C. elongata*, with a small proportion of *C. obovata* and argel leaves), and *Tagetes erecta*, florets and fruit (sold as *calendula*).

The following list contains the names of the successful candidates entitled to receive the diploma at the annual commencement, and includes the names of those having passed in the preceding year and since then completed their term of service; the titles of the theses presented by the candidates are also appended.

Frank Leamer Akers, Pennsylvania, *Cantharis*.
 Clarence George Anderson, Ohio, Fluid extracts.
 Granville Louis Angeny, Pennsylvania, *Petrolatum*.
 Jay Warren Angle, Pennsylvania, The metric system.
 Harry Augustus Bacon, Pennsylvania, *Physostigma*.
 Arthur Hamilton Bailey, Pennsylvania, *Liatriis graminifolia*.
 Hugh Augustus Barkhuff, New York, Solution of chloride of zinc.
 William Jacob Baumgartner, Pennsylvania, Natural mineral waters.
 Samuel Beaver, Pennsylvania, Chlorine water.
 Benjamin Franklin Beers, Pennsylvania, *Pyrethrum* as an insecticide.
 William Beidler, Ohio, *Æther*.
 Leroy Berg, Pennsylvania, *Gillenia trifoliata*.
 George Edward Bietsch, Pennsylvania, *Polygonum hydropiper*.
 William Martin Birk, Indiana, Benzoinated lard.
 Augustus Smith Blackman, Pennsylvania, *Cicuta maculata*.
 Henry Cowan Blair, 3d, Pennsylvania, *Cornus*.
 Adam John Blauth, New Jersey, Aniline.
 Harry Leslie Boggs, West Virginia, Tinctures, solid and fluid extracts.
 Joseph Peeky Bolton, Pennsylvania, Tinctures.
 Elias Kline Boltz, Pennsylvania, *Ergota*.
 John Thomas Brennan, Pennsylvania, Milk.
 Harry Walter Brick, Massachusetts, *Cortex cocillana*.
 Charles Brown, Pennsylvania, *Nux vomica*.
 James Howard Burnett, New Jersey, *Glycerinum*.
 Alfred Brooks Cadmus, Pennsylvania, *Ammonii carbonas*.

Elmer Lindsay Cameron, Pennsylvania, Petroleum.
 Harry Casper Carey, New Jersey, Olive tree and its products.
 Harry English Casey, Pennsylvania, Medicated waters.
 Albert Samuel Christman, Pennsylvania, Duties of a pharmacist.
 Thomas Philip Collins, Ohio, Pill coating.
 Newton C. Comfort, Pennsylvania, Salol.
 George McClellan Conard, Pennsylvania, Granular salts.
 Zeb. Vance Conyers, N. Carolina, Liq. Hydrargyri nitratis.
 Wharton Landis Cornell, Delaware, Salix.
 Charles Franklin Craig, Ohio, Oil of wintergreen.
 William Kinnard Croft, Pennsylvania, Benzin test for beeswax.
 George Edmund Daniels, Colorado, Adeps and its adulterations.
 Alvah Molony Davis, Pennsylvania, Galangal Rhizome.
 Harry Morgan Davis, Pennsylvania, Fluid extract of wild cherry.
 Joseph Carl De La Cour, New Jersey, Eugenol in oil of cloves.
 William John Dickel, Pennsylvania, Spigelia.
 Edwin Alfred Donecker, Pennsylvania, Syrupus tolutanus.
 Robert Ligorius Donoghue, Pennsylvania, Precipitation of fluid extracts.
 Andrew William Dowd, Nebraska, Andromeda mariana.
 Schuyler Colfax Eckhard, Kansas, Fructus xanthoxyli.
 Arthur Hugh Elliott, Pennsylvania, Preservation of lard.
 Clarence William Elston, Pennsylvania, Tincture of gelsemium.
 William Taws England, Pennsylvania, Pharmaceutical notes.
 John Hake Epply, Michigan, Solidago virgaurea.
 Jacob Eppstein, Pennsylvania, Myrica asplenifolia.
 John Peter Failing, New York, Phlox Drummondii.
 Enoch Pennock Ferguson, Pennsylvania, Drug exhaustion.
 Martin Luther Finkbiner, Pennsylvania, Eupatorium leucolepis.
 John Joseph Finney, Pennsylvania, Formation of saline mineral waters.
 Thomas Leroy Fisher, Nebraska, Lactic acid.
 James Floyd Fox, Kansas, Glycyrrhizin.
 Allen J. Frankelberger, Pennsylvania, Pepsin.
 Nelson Becker Fry, Pennsylvania, Glyceritum vitelli.
 Frank Smith Githens, New Jersey, Damiana.
 James Goodman, Pennsylvania, Crystallization.
 John F. Gradwohl, Delaware, Tinctura Opii.
 William Valentine Green, Pennsylvania, Mercury.
 William Robert Gressley, Pennsylvania, Aqua acidi carbonici.
 Joseph Alexander Guerin, South Carolina, Liq. ferri tersulphatis.
 Harry Guest, New Jersey, Glycerin suppositories.
 Herman Frederick Hahn, Pennsylvania, Liqueur potassæ.
 Oliver Benjamin Jacob Haines, Pennsylvania, Liqueur calcis.
 Joseph Ridgway Haines, New Jersey, Aluminium.
 Bruce Clyde Hallowell, Pennsylvania, Aqua.
 Harry Cobb Hand, New Jersey, Stillingia sylvatica.
 Curtis Alexander Harbold, Pennsylvania, Extractum euonymi fluidum.
 Ray C. Head, Pennsylvania, Syrupus scillæ.
 Edward Henry Hechler, Ohio, Monsell's solution.
 William Frederick Henry, Ohio, Liatris spicata.

- Harry Reed Hess, Pennsylvania, Preservation of syrups.
 William Heverin Hobson, Delaware, Sponge.
 Walter Melvin Hornby, Pennsylvania, Assay of belladonna.
 Burt Taylor Hutchison, Pennsylvania, Assay of powdered guarana.
 Walter William Jacob, Pennsylvania, Granular effervescent salts.
 Harry Joseph John, Pennsylvania, Nickel steel.
 Edward Franklin Johnson, California, Liquor ferri citratis.
 Howard Marion Jordan, Iowa, Beet sugar.
 Henry Festus Kaercher, Ohio, Eupatorium perfoliatum.
 James Daniel Karcher, New Jersey, Preliminary education in pharmacy.
 Harvey Lafayette Keiper, Pennsylvania, Impomœa purgans.
 Charles Lewis Keppler, Louisiana, Sanguinaria canadensis.
 Alvin B. Kline, Pennsylvania, Sophistications in pharmacy.
 George Heyde Krall, Pennsylvania, Mangifera indica.
 John Thomas Krall, Pennsylvania, Our debt to science.
 Frederick Krauss, Pennsylvania, Tinctura nucis vomicæ.
 Harry J. Krebs, Pennsylvania, Emulsions.
 Willis George Kunkle, Pennsylvania, Extract of beef.
 Addington LaDow, New Jersey, The Drug business of the future.
 Jacob Sigmund Lammer, Pennsylvania, Stillingia sylvatica.
 Charles Paul Landis, Pennsylvania, Borax.
 Francis Patterson Landon, Virginia, Lanolin.
 Charles Thomas Larkins, Ohio, Cantharis.
 Henry Tomlinson Lefferts, Pennsylvania, Nitroglycerin.
 Lawton Carlisle Lipscomb, South Carolina, Medicine and pharmacy.
 William Henry Long, Pennsylvania, Oleates.
 James Reber Lorah, Pennsylvania, Olive oil and its adulterants.
 Lester Irwin Lorah, Pennsylvania, Lugol's solution.
 Emanuel Lupin, Russia, Erythroxyton Coca.
 Edward Scudder Mackey, New Jersey, The soda water in pharmacy.
 George Clarence Mackey, New Jersey, The aconites of North America.
 Charles La Forge Manning, Pennsylvania, Oleum gaultheriæ.
 James Henry Martin, Kentucky, Gymnocladus canadensis.
 Edward Sloan McCandless, Pennsylvania, Chemistry of the atmosphere.
 Frank Stewart McCartney, Pennsylvania, Solution of caustic soda.
 James McClintock, Pennsylvania, Improved Blaud's pills.
 William McCorkle, Pennsylvania, Preparation of hypophosphites.
 Robert Roger McCormick, Iowa, A Problem.
 Charles Penceratius McDonnell, Pennsylvania, Lactucarium.
 Robert Munford McFarland, Kentucky, Verbena urticifolia.
 Samuel McWilliams, Pennsylvania, Cinchona.
 Eugene Charles McGregor, South Carolina, Phytolaccæ radix.
 Edgar Morton Matthews, Georgia, Gum myrrh.
 Charles Edward Mengel, Missouri, Iodoform.
 Levi Walter Mengel, Pennsylvania, North American Meloidæ.
 John Harvey Miller, Pennsylvania, Medicamentariæ literæ.
 William Houston Milliken, Pennsylvania, Rhamnus purshiana.
 Henry Mitchell, Pennsylvania, Alcohol.
 Alexander Harrison Murrell, Maryland, Strawberries.

- William Tice Myers, Pennsylvania, Theine and caffeine.
 Samuel Oliver Netherton, Kansas, Phlox pilosa.
 Frederick John Nye, New York, Tartaric acid.
 William Philip Oberhauser, Illinois, Solidago rugosa.
 William Joseph O'Brien, New Jersey, Verba santa.
 Gurdon Ellis Pellett, Pennsylvania, Hydrochlorate of cocaine.
 Rewellein Cornelius Peters, Pennsylvania, Oleum gaultheriæ.
 George Washington Pfromm, Pennsylvania, Acidum boricum.
 Francis Elmer Post, Pennsylvania, Sterculia acuminata.
 Silas Oscar Putnam, Kansas, Triticum repens.
 Harry Lee Randal, West Virginia, Cascara sagrada.
 Edwin Cole Ranney, Nebraska, Tri-iodomethane.
 Elmer Augustus Reidenbach, Pennsylvania, Mentha piperita and preparations.
 Samuel Jacob Remington, Pennsylvania, Strophanthus.
 May Reynolds, Pennsylvania, Pills.
 John Henry Rhein, Pennsylvania, Pepsin.
 Robert Grant Rinedoller, Pennsylvania, Erythroxyton Coca.
 Francis Rinker, Pennsylvania, Irish moss for emulsions.
 James Henry Richardson, Maryland, Syrupus ferri iodidi.
 William Sloan Rishton, Pennsylvania, Ptelea trifoliata.
 Theodore William Roth, Pennsylvania, Strychnine and brucine.
 John Palmer Rothermel, Pennsylvania, Koumyss.
 Charles Warren Ryñard, Pennsylvania, Malt.
 Louis Napoleon Sahm, Missouri, Should physicians dispense their own medicines?
 Irvin S. Schmehl, Pennsylvania, Crocus.
 Charles Schneider, Pennsylvania, Senna.
 Charles Albert Schloer, New York, Iron.
 George Callan Scott, Pennsylvania, Oleoresins.
 Charles Augustus Seler, Pennsylvania, Percentage of ash in ammoniacum.
 Erwin Clement Shafer, Pennsylvania, Panax quinquefolia.
 Frederick Charles Shaw, Ohio, Eupatorium rotundifolium.
 Edward Joseph Sheehan, New York, Petrolatum.
 Thomas Water Shore, Pennsylvania, Peppermint.
 Charlès M. Shumaker, Iowa, Glycerinum.
 William Allen Sickel, Pennsylvania, Should Physicians be Dispensers?
 George Arthur Simmons, Pennsylvania, Our own *vs.* patent preparations.
 Robert Lamberton Singer, Pennsylvania, Phosphoric acid.
 Ross Merryman Slick, Maryland, Scopola carniolica.
 Albert Smith, Kansas, Acidum hydrocyanicum dilutum.
 Allen Henry Smith, Pennsylvania, Rhamnus purshiana.
 George Anselm Smith, Pennsylvania, Antypyrin.
 George Lewis Smith, Pennsylvania, Tincture of kino.
 Milton Clyde Smucker, Ohio, Pepsin.
 Edgar Reid Sparks, Pennsylvania, The apprentice.
 Edgar Lacy Speer, Pennsylvania, Precipitated sulphur.
 Edward Theodore North Stein, Pennsylvania, Syrup of Hydriodic acid.
 Harvey Nevin Stem, Pennsylvania, Iron.
 Harry Miller Sultzbach, Pennsylvania, Nicotiana Tabacum.

Samuel Sutton, Pennsylvania, Ipecacuanha.
 Howard M. Taggart, Pennsylvania, Nitro-hydrochloric acid.
 Merle Hampton Taylor, Pennsylvania, Syrup of yerba santa.
 Oan Joshua Thompson, Pennsylvania, Fluid extracts.
 Edward Charles Tragesser, Pennsylvania, Citrate of iron.
 George Franklin Troutman, Pennsylvania, Cod liver oil.
 Thaddeus Thomas Trump, Ohio, Gossypium.
 Philip Percy Turner, Maryland, Mercurial ointment.
 Albert Nelson Van Dyke, Pennsylvania, Glycerin suppositories.
 Frederick John Voss, Germany. Poison.
 Edwin Wable, Iowa, Magnolia glauca.
 Andrew Wendel Walter, Pennsylvania, Resin of cotton root bark.
 John Henry Walls, Pennsylvania, Sericum.
 John Winter Wamsley, New Jersey, Eucalyptus Globulus.
 John Wilson Weiler, Pennsylvania, Medicated waters.
 Walter Rupert Weiser, Pennsylvania, Naphthalin.
 Nicholas Fredrick Weisner, Pennsylvania, Atmosphere.
 Karl Henry Westphal, Germany, Peroxide of hydrogen.
 Charles Henry White, Pennsylvania, The olive.
 Preston Barnes White, Pennsylvania, Ointment bases.
 Thomas Jefferson Wier, Jr., Maryland, Cornus florida.
 Howard Marion Wilkinson, Delaware, Syrup of tolu.
 Charles Morgan Williams, New Jersey, Carbon dioxide and its industrial applications.
 Solomon Cohen Williams, South Carolina, Cascara sagrada.
 Wm. Henry Kitzmiller Wingert, Tennessee, Phlox maculata.
 John Kaler Wittel, Pennsylvania, Antipyrin.
 Oliver Brown Wolff, Pennsylvania, Milk.
 Richard Julius Wollmuth, Pennsylvania, Asbestos amianthus.
 Tilgham Wesley Yeager, New Jersey, Syrup of Benzoin.
 Charles Ragan Yohn, Maryland, Pharmaceutical sins.
 Albert Lewis Ziegler, Pennsylvania, Turpentine.

The members of the graduating class came from the following states: 124 from Pennsylvania, 16 from New Jersey, 11 from Ohio, 6 from Maryland, 5 each from Kansas and New York, 4 each from Delaware, Iowa, and South Carolina, 3 from Nebraska, 2 each from Kentucky, Missouri, West Virginia and Germany and one each from California, Colorado, Georgia, Indiana, Illinois, Louisiana, Massachusetts, Michigan, North Carolina, Tennessee, Virginia and Russia; total number, 202.

The professors' farewell supper to the graduating class was held in the museum of the College, on Wednesday, April 20, the officers and trustees of the College, and several guests from other cities being likewise present. During the evening Mr. Failing, president of the Zeta Phi Society, on behalf of the graduating class, presented to the College a crayon portrait of Professor Trimble; also a handsome United States flag, and a banner in blue and white—the college colors adopted during the session—the latter having the inscription, "P. C. P., 1821-1892." These gifts were received, the portrait by Professor Sadtler, and the flags by Charles Bullock, Ph.M., president of the

College. The announcement was made of the present year being the golden anniversary of graduation of Wm. J. Jenks, Ph.M., one of the vice-presidents of the College, who was a member of the graduating class of 1842, and the congratulations of those present were extended. Many pleasant speeches were made during the evening; the College Glee Club rendered some songs and at a late hour this final class reunion came to a close, the company singing "Auld lang syne."

Notwithstanding the unpleasant weather the Academy of Music was well filled with an attentive audience on the evening of Thursday, April 21, on the occasion of the seventy-first annual commencement. President Charles Bullock conferred the degree of Graduate in Pharmacy upon the candidates named above; and certificates of Proficiency in Chemistry were awarded by Professor Sadtler, on behalf of the Board of Trustees, to Josiah C. Peacock, of Maryland, and Chas. S. Vadner, of Massachusetts.

As a result of the final examinations honorable mention was awarded, with the grade "distinguished," to H. R. Hess, F. C. Shaw and C. R. Yohn; and with the grade "meritorious" to H. W. Brick, J. H. Martin, R. M. McFarland, E. C. McGregor, C. W. Rynard and M. C. Smucker. The Chemistry prize, a chemical balance, offered by Professor Sadtler for original quantitative analysis was presented to R. M. McFarland, honorable mention being accorded to A. W. Dowd. The John M. Maisch prize, \$20 in gold, offered by Mr. J. H. Redsecker, of Lebanon, Pa., for histological knowledge of drugs, was earned by A. S. Blackman, and the Stein Materia Medica prize, \$20 in gold, offered by J. H. Stein, Ph.G., of Reading, Pa., by H. R. Hess, honorable mention being due, in connection with these two prizes, to G. L. Angeny, H. W. Brick, W. L. Cornell, C. F. Craig, G. E. Daniels, A. W. Dowd, J. F. Fox, N. B. Fry, J. A. Guerin, H. L. Keiper, Fred. Krauss, L. C. Lipscomb, J. R. Lorah, R. M. McFarland, E. C. McGregor, S. O. Netherton, C. W. Rynard and C. R. Yohn. The Operative Pharmacy prize, \$25 in gold, offered by Mr. E. L. Boggs, of Charleston, W. Va., for the best examination in operative pharmacy was carried off by Henry Mitchell, honorable mention being made of H. L. Boggs, E. W. Elston, H. R. Hess, S. J. Remington and C. R. Yohn. The Theoretical Pharmacy prize, for the best examination in the branch named, a prescription balance offered by Mr. H. J. Maris, was awarded to F. C. Shaw with honorable mention of R. C. Donoghue, J. A. Guerin, H. R. Hess, W. P. Oberhauser, C. W. Rynard and C. R. Yohn. The recipient of the Robinson Chemical prize, a gold medal and certificate, offered by J. S. Robinson, Ph.G., of Memphis, Tenn., for the best examination in general and analytical chemistry, was H. F. Hahn.

The valedictory address to the graduating class was delivered by Professor Maisch; besides the parting advice to the graduates, a brief sketch of the history of the College was given, which appeared to be appropriate at the present time when the institution has again undertaken many improvements for increasing the facilities and enlarging the scope of its educational work. As usual the proceedings of the evening were enlivened with music and closed with the distribution of the presents sent upon the stage for the individual graduates by their friends. This latter feature, we are pleased to observe, has considerably decreased in the number of floral and other gifts, notwithstanding the increased

number of the graduates; and the time seems to be near at hand when that custom will be entirely abandoned.

St. Louis College of Pharmacy.—At the annual meeting held March 28th, the following officers were elected: President, H. E. Hoelke; Vice-President, Edmund P. Walsh; Treasurer, Solomon Boehm; Secretary, Dr. John C. Falk; Corresponding Secretary, G. H. Chas. Klie. Board of Trustees: Henry Braun, Henry W. Scheffer, H. Frielingsdorf, Charles Gietner, H. F. A. Spilker and Adolphus Braun. The next lecture course will be opened in the new college on Lucas Place. The excavations and foundation walls of the building are finished, and the superstructure will be both handsome and commodious.

The Commencement was held at Memorial Hall, March 31st. The graduating class numbered 47, as follows: Frank H. Ameling, Wm. F. Angermueller, Samuel Earnest Barber, William Baron, Emil C. Behrens, Charles E. Bennett, Augusta A. Bock, Jerome C. Carr, Arthur L. Cason, William C. Dirmeyer, Robert A. Doyle, Elbert Dunlap, Louis A. Fischer, Fred. H. Fricke, Herman G. Fritz, Charles F. Geiger, Wm. C. Haman, Max P. Heinrich, Albert D. Horstman, William F. Ittner, Henry Keim, Joseph Kelley, Joseph F. Lager, Fred. R. Lehman, Wm. H. Lemmon, Wm. F. Lindemann, Andrew S. Ludwig, William B. McDonald, Robert F. Miller, Ambrose Mueller, Sterling P. Randall, Edward B. Reed, Edward C. Reisse, Carl M. Renkert, John F. Reuter, John Riemann, Nathan Saenger, Edward W. Sasse, Ernst Louis Semsrott, Charles F. Soldan, Jr., Charles E. F. Streutker, John H. A. Temm, Louis W. Temm, Charles R. Trickey, Frederick O. Voss, Ernst A. Winkelmann, Theodore M. Young. The following prizes were awarded: The Alumni Gold Medal to Wm. H. Lemmon, New Albany, Ind.; the College Silver Medal to Augusta A. Bock, Smithton, Ill.; the Oldberg-Wall prize to Chas. F. Geiger, Boonville, Mo.; for the best examination in pharmacy to Wm. F. Angermueller, St. Louis; for the best examinations in practical pharmacy to Ambrose Mueller, of St. Louis, and Wm. B. McDonald, Montreal, Can.; for the best examination in Practical Chemistry to Chas. F. Soldan, Jr., Macon, Mo., and for the best junior examination to George C. Boyd, Blandville, Ky. Valedictory addresses were delivered by Prof. O. A. Wall, M.D., Ph.G., on the part of the faculty, and by Sterling P. Randall, Ph.G., on behalf of the class. "*No flowers*" was the motto at the bottom of the plain but handsome invitation cards sent out, and there were no flowers.

The Maryland College of Pharmacy held its fortieth annual commencement April 12th. at Harris's Academy of Music, when President Louis Dohme conferred the degree of Graduate of Pharmacy upon the following candidates:

James Robert Allen, Geo. M. Abendschein, J. Harry Beckley, G. Clinton Blades, R. Kent Blair, William W. Bowers, S. Blair Caldwell, E. Menotti Callaghin, William D. Cawley, Henry Randolph Cheers, Edward C. Esslinger, W. Ashton Evans, E. D. Fisher, John M. Heard, Edward Hoffmeister, John Philip Irwin, James W. Jeffries, J. F. Charles Klepper, Harry Lightner Leeke, Emil Lindemann, M. J. McAvoy, Charles L. Meyer, Daniel L. Miller, Charles H. Mills, Rollins Mullikin, Eduard Quandt, Walter Leak Richardson, Walter Scott, J. E. Seebold, Moses Sexton, W. Spedden Seymour, J. Frank Starling, Gustav Charles Thieme, Geo. A. Van Lear, Wm. B. Van Lear, Charles W. Vogel, Frank E. Wagner, C. Milton Wells, Henry Halstead Wyer.

H. L. Leeke was the recipient of three gold medals, the first College, the Simon Analytical and the Practical Pharmacy prizes. Gold medals were also awarded to E. Hoffmeister, W. L. Richardson, and Henry R. Cheers; likewise to Geo. A. Wilford, of the junior class. Rev. W. D. Ball delivered the address to the graduates, and Henry R. Cheers, the valedictory address on behalf of the class.

The Illinois College of Pharmacy held its commencement at the close of the winter session, February 26, with 48 graduates.

The Albany College of Pharmacy had 23 graduates at the annual commencement, held March 7.

The Pittsburgh College of Pharmacy conferred the degree of Ph.G. upon 11 candidates.

The Purdue University School of Pharmacy had 21 graduates at the commencement, held March 14.

The Chicago College of Pharmacy had a graduating class of 29 at the commencement held April 19 at Hooley's Theater.

The Brooklyn College of Pharmacy had 12 graduates at its first commencement held April 28.

The New York College of Pharmacy will hold its commencement at Carnegie Music Hall, the graduating class numbering 103.

The Alumni Association of the Philadelphia College of Pharmacy held its 28th annual meeting in one of the lecture-rooms of the College building on the afternoon of April 19, President Jos. W. England in the chair, when the usual address and reports of officers and committees were submitted. The officers elected for the current year are: President, C. Carroll Meyer, class 1873; Vice-Presidents, David H. Ross, '78, and Wm. L. Cliffe, '84; Treasurer, Edward C. Jones, '64; Secretary, Wm. E. Krewson, '69; Corresponding Secretary, Jacob S. Beetem, '78; members of the Executive Board, J. W. England, '83, Dr. J. L. D. Morison, '88, Jos. C. Roberts, '85, and J. T. Hoskinson.

In the evening the reception to the graduating class took place at Association Hall. The exercises which were interspersed with music from the Zeta Phi Glee Club and the P. C. P. Quartette, consisted of an address by President England; the presentation of the Alumni certificate of membership; the awarding of prizes; the class oration by J. H. Martin, of Maysville, Ky.; a historical sketch of the class by F. C. Shaw, of Zanesville, O.; a discourse on the future of the class by F. S. Githens, of Salem, N. J.; the recitation of the class poem by P. B. White, of Chambersburg, Pa., and the awarding of the microscopy certificates. The following prizes for best examinations were awarded: General examination, the Alumni gold medal, to H. R. Hess, of Montgomery, Pa.; certificates, *Materia Medica*, to R. M. McFarland, Henderson, Ky.; Pharmacy, to F. C. Shaw, Zanesville, O.; Chemistry, to J. H. Miller, Pottsville, Pa.; General Pharmacy, C. W. Rynard, Harrisburg, Pa.; Operative Pharmacy, H. Mitchell, Philadelphia; Analytical Chemistry, to S. Beaver, Annville, Pa.; Specimens, to M. C. Smucker, Newark, O.; and for best junior examinations to W. R. Lamar, Augusta, Ga. The prize certificate for the best collection of botanical specimens was awarded to H. A. Laessle, of Philadelphia.

EDITORIAL.

A *circular letter* relating to the *Seventh International Congress* has been issued by the officers of the American Pharmaceutical Association in the English, French and German languages, which were the official languages of the preceding Congresses. The letter explains itself:

TO THE PHARMACEUTICAL SOCIETIES AND THE PHARMACISTS OF ALL COUNTRIES, GREETING:

The American Pharmaceutical Association had extended an invitation to the Third International Pharmaceutical Congress, held at St. Petersburg, in 1874, to call the Fourth Congress in Philadelphia in 1876, during the Centennial International Exposition; but the selection of a city in the United States was deemed inadvisable at that time.

After it had been decided that the World's Columbian Exposition should be held in the city of Chicago in 1893, the American Pharmaceutical Association again invited the International Pharmaceutical Congress to meet in this country. The Italian Committee on Organization having, by circular of May 15, 1891, and for reasons stated therein, renounced the convocation of the Seventh International Pharmaceutical Congress at Milan; the Executive Committee of the Sixth Congress, at Brussels, by letter of November 26, 1891, confirmed the invitation of the American Pharmaceutical Association; and in a communication of February 16, 1892, the former Committee on Organization at Milan, expressed the view that there was nothing, under the circumstances stated, to prevent the organization of the Seventh International Pharmaceutical Congress in 1893, in Chicago.

Now, in view of the above facts, the undersigned officers of the American Pharmaceutical Association take pleasure in extending a hearty invitation to the Pharmaceutical Societies of all countries to appoint delegates to the International Pharmaceutical Congress, which is to assemble in the city of Chicago during the year 1893, and in which teachers to Pharmaceutical Institutions and pharmacists in general are likewise cordially invited to participate.

It is especially desired that the contents of this circular letter be brought to the notice of kindred societies, and that information be given to the undersigned secretary, relating to suggestions of subjects of general importance, suitable for discussion and action by the Congress, as well as to the intention of Pharmaceutical Societies, of Pharmacists and of Teachers of Pharmacy in other countries, of being present or represented at the Congress of 1893.

Further steps for promoting the objects and deciding upon the date of the Congress will be taken at the meeting of the American Pharmaceutical Association in July of the present year. Meanwhile the undersigned desire to assure all who may come, as members or as visitors, to the International Pharmaceutical Congress at Chicago, in 1893, of the very cordial reception on behalf of the pharmacists of the United States of America.

ALEX. K. FINLAY,

*Pharmacist in New Orleans;
President of the American Pharmaceutical Association.*

JOHN M. MAISCH,

*Professor of Materia Medica and Botany;
Permanent Secretary of the American Pharmaceutical Association.*

OFFICE OF THE PERMANENT SECRETARY.

143 NORTH TENTH STREET, PHILADELPHIA. March 30, 1892.

New College Buildings.—A Committee of the Board of Trustees of the Philadelphia College of Pharmacy has been at work for some time past perfecting plans for erecting a new front building on Tenth Street, and for making various changes and improvements in the lecture-rooms and laboratories contained in the buildings, which extend eastward to Elwyn Street. Immediately after the close of the examinations the four houses, Nos. 139 to 145, fronting on North Tenth Street, were vacated, and at the present time, near the close of April, have been almost completely taken down, so that early in May the preparations for building the foundations will be completed. Without intending to give a description of the improvements now under way, it will be of interest to our readers to mention the principal features, which may be briefly stated as follows: The ground floor of the new building will contain the entrance to the lecture-rooms and laboratories, the actuary's office with reception-room, a committee-room and the library. The second and third stories will form a large hall, with galleries, for the accommodation of the College Museum, including the various collections; the fourth story will contain the publication office of the AMERICAN JOURNAL OF PHARMACY, and the private office of the editor; also a hall for the Alumni Association and rooms for the janitor and his family. The fifth and sixth stories will be reserved for general purposes as needed by the College. The improvements now under way necessitate also the taking down of a portion of the west wall of the College building erected in 1868, for the purpose of remodelling the principal stairway. The hall, which has thus far been used as the museum, will become Professor Sadtler's lecture-room, and thus the chemical department of the College, including lecture-room and chemical laboratories, will be located on the ground floor. The interior of the lecture-rooms for pharmacy and for materia medica will be completely torn out and refitted, with the view of facilitating the instructions and furnishing greater convenience to the students. The laboratories will also be rearranged and enlarged, and the details of lighting, heating and ventilating the buildings will receive due attention. All the improvements will be completed during the coming summer, and the new front building will be ready for occupancy by October 1st. In the meantime the temporary offices of the JOURNAL and of the College will be at 147 North Tenth Street, in the house adjoining the College property.

The St. Louis College of Pharmacy has commenced the erection of a new building; and the New York College of Pharmacy will in a few days decide on the site upon which to erect a building suitable for its use.

Prosecutions against druggists and apothecaries.—The Pennsylvania Pharmacy law makes it the duty of the State Pharmaceutical Examining Board to investigate all charges of violation of its provisions, and to prosecute all persons so offending. On March 30th last, two wholesale drug firms were bound over by Magistrate Pole to answer the charge of adulterating and falsifying laudanum and selling it in violation of Section 9 of the pharmacy law. At the preliminary hearing, it was testified that a detective had bought one dozen bottles of laudanum at each place, for which 45 cents was paid. According to the testimony of Prof. Dr. Leffmann, the laudanum was deficient in strength from 33 to 55 per cent. The penalty for "knowingly, wilfully or fraudulently falsifying or adulterating . . . any preparation authorized or recognized by the

pharmacopœia of the United States" is a fine not exceeding \$500 and forfeiture to the commonwealth of all articles so adulterated.

On April 22d three apothecaries had a second hearing before Magistrate Pole on the charge of having sold "Rough on Rats," a poisonous article, consisting largely of arsenic, without complying with section 10 of the pharmacy law, which requires that each package of poison shall be distinctly labeled; that the seller shall satisfy himself, before delivering the poison, as to its use for legitimate purposes; and that the sales of deadly poisons (destructive to life in doses of five grains) shall be registered in a poison book. We believe that most retailers have, heretofore, sold the article in question, without any special precaution, or merely labeling each package with the word "poison," under the belief that a proprietary article was not subject to the poison regulations of the pharmacy law. The language of section 6 is somewhat ambiguous, but upon close scrutiny it will be seen to provide that "nothing contained in the act shall in any manner whatever interfere . . . with the making and dealing in *proprietary remedies popularly called patent medicines*, nor prevent storekeepers from dealing in and selling the commonly used medicines and poisons if such medicines and poisons conform in all respects to the requirements of section nine, provided the provisions of section ten are fully complied with." The italicized words evidently exclude vermin poisons, which are not "remedies" or "medicines" in the sense here used, and bring them under the regulation made for "poisons." The Magistrate took the common sense view that no violation of the law had been intended and discharged the defendants upon promising to comply with its provisions for the sale of poisons.

Correction.—A clerical error, which was overlooked in proof-reading, occurs in the paper on *Polygala alba*, in our last number, p. 181, line 16 from top; 4 to 6 inches = 20-30 cm., should read 4 to 6 inches = 10-15 cm.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Monograph of the Grasses of the United States and British America. By Dr. Geo. Vasey, Botanist, Department of Agriculture. Published by authority of the Secretary of Agriculture. Washington: Government Printing Office. 1892. 8vo. Pp. xiv and 89.

This constitutes the first part of volume iii of the Contributions from the U. S. National Herbarium, and comprises the tribes of Maydeæ, Andropogoneæ, Zoysiæ, Paniceæ, Oryzæ, Phalarideæ and Agrostideæ of the important order of Gramineæ. The monograph is a very praiseworthy undertaking, and the care bestowed upon its preparation is clearly evidenced; yet the author thinks that "many changes or modifications will be needed whenever it is possible to examine the original specimens" (particularly those of the Pacific Coast and of the southwestern boundary).

Preliminary List of the Mosses of Lancaster County, Pa. By John K. Small. 8vo. Pp. 8.

The list comprises about 150 species, and is a valuable contribution to botanical literature.

Le Genre Meliola. Anatomie ; Morphologie ; Systématique. Par A. Gailard, préparateur au laboratoire de botanique générale et lauréat de l'École supérieure de Pharmacie. Lons-le-Saunier. 1892.

This monograph on the anatomy, morphology and systematic position of the genus *Meliola* was prepared as a thesis for obtaining, from the pharmacy school at Paris, the diploma of pharmacien of the second class. The descriptive part of the text enumerates 111 species, and excludes 27, of which number 3 species are considered doubtful. The genus belongs to the order of Perisporiaceæ among the lower fungi. The text of 163 pages is accompanied by 24 lithographic plates, illustrating the species described.

The Mediterranean Shores of America. Southern California : its Climatic, Physical and Meteorological Conditions. By P. C. Remondino, M. D., member of the American Medical Association, etc. Fully illustrated. Philadelphia : The F. A. Davis Company, Publishers. 1892. 8vo. Pp. xiv and 160. Price, paper, 75 cents ; bound in cloth, \$1.25.

"California, meteorology, is something that will interest the reader, whether in search of a more genial home, or in search of lost health, or even if only as a matter of new information about one's own country." This statement of the author would seem to us to be subject to considerable extension, and should be taken to apply particularly to those who, for a briefer or longer period, became acquainted with the climate of the Pacific shore, but whose home is located nearer the Atlantic coast ; they will peruse his descriptions of the meteorological and climatological conditions of this favored region, with unabated interest, because of the plain and convincing manner in which they are made, though these conditions may appear strange to those who are not, in a measure, familiar with them. The discussion as to the influence of these conditions upon health and disease are, as a matter of course, of primary importance to the physician ; but technical language having been avoided as much as possible, the consideration of these topics does not diminish the attractiveness which the book has for the intelligent lay reader. For the information of the physician a list of books is given which treat upon allied subjects, either in a general way, or with special application to contiguous localities. The book is embellished with forty-five illustrations, with a map of the coast district of Southern California, and another map giving profiles, east and west, of the same district.

Pharmacographia Indica.—A history of the principal drugs met with in British India. By Wm. Dymock, Brigade-Surgeon, retired etc., C. J. H. Warden, Surgeon-Major, Bengal army, etc., and David Hooper, Quinologist to the Government of Madras, Ootacamund. London. Kegan, Paul, Trench, Trubner & Co., Ltd., 1892. Part V. Pp. 312.

This is the first part of the third volume of this valuable and interesting work, and comprises the drugs of the groups Personales and Lamiales of the Gamopetalæ, and of most of the monochlamydeous orders, including the greater portion derived from the Euphorbiaceæ. Of drugs and plants known or used in North America, the following are also employed in India : *Verbascum Thapsus* is prescribed by Mahometan physicians in gout and rheumatism in combination with aperients. *Sesamum indicum* is used for a variety of purposes ; besides the oil, the leaves and seeds are employed, being considered emollient, laxative, emmenagogue, aphrodisiac, and useful in cough. as an

application to burns, and for promoting the growth and darkening the color of the hair; for the latter purpose a decoction of the root is likewise used. *Verbena officinalis* is considered tonic and astringent, and useful in paralysis and amenorrhœa. The smell of *Ocimum Basilicum* is disliked by the Hindus, but the Mahometans are very partial to it. *Lavandula Stœchas* is regarded in India as "the broom of the brain sweeping away all phlegmatic impurities," etc. *Mentha spec.*; the mints are considered to be hot and dry, and are prescribed in dyspeptic affections, fluxes and dropsy. *Origanum Majorana* is similarly employed. *Thymus Serpyllum* is lauded by Mahometan writers for a variety of purposes. The seeds of *Plantago major* are largely imported into India from Persia, and have a great reputation in dysentery.

The seeds of *Mirabilis Jalapa*, Four-o'clock, are said to be sometimes used to adulterate pepper; the root, with spices, is employed as a strengthening medicine, the leaves for cataplasms, and the juice as a cooling application in urticaria. Spinach, *Spinacia oleracea*, is much valued by the Mahometans for its cooling and emollient properties, the juice as a diuretic and gargle, and a decoction in febrile affections, in lithiasis, and in inflammation of the lungs or bowels. *Polygonum aviculare*, knotgrass, is still used by the Hakims as in ancient times, as a vulnerary and astringent. The *rhubarb* found in the Indian bazars is very inferior, in long stick-like pieces, comes from China, has hardly any aroma, and but slight purgative action, and is used by the natives as a tonic and stomachic. Mahometan physicians describe *black pepper* as deobstruent, resolvent and alexipharmic, and use it as a nervine tonic, diuretic and emmenagogue. *Long pepper* is employed in a similar manner; and in addition the roots and creeping stems are largely used under the name of *pippali-mula*. *Cubeb* is diuretic, deobstruent, and a useful application to putrid sores and pustules in the mouth; some Mahometan writers have called it *hab-el-arûs*, bridegroom's berry. *Nutmeg* and *mace* are described by Mahometan doctors as stimulating, narcotic, digestive, tonic and aphrodisiac. *Camphor* is largely used in India in performing the *ârti*, a ceremony in adoration of some god, by waving, in a circle before the image, a platter containing a five-wicked burning lamp, flowers and incense, the lamp being fed with camphor; the same rite, only substituting a bridegroom for the idol, is called *ârta*, and is performed on the arrival of the bridegroom at the house of the bride. *Chinese cinnamon* and the volatile oil imported from China are used medicinally in India in much the same manner as in Europe; Ceylon cinnamon is not an article of commerce in India. Of *Laurus nobilis* it is stated that "the dry leaves are distilled in America for the essential oil used in the preparation of bay rum." This is an error; the oil of bay, used for bay rum, is obtained from *Myrcia acris*, as we showed in 1861. The wood of *Santalum album*, grown in the Mysore Province is little known outside of India, and the sandalwood oil is sold by the Mysore government at the annual auction along with the wood, and chiefly bought up for exportation to China and Arabia. *Euphorbia pilulifera* is a popular remedy for worms, bowel complaints, cough and gonorrhœa, and as a local application for the cure of ringworm; its Marathi name *Nayeti* signifies ringworm. The purging nut, *Jatropha Curcas*, is sometimes used by Hindu physicians as a purgative and alterative; the oil is reckoned a valuable application to itch, herpes, chronic rheumatism and sores or wounds; the leaves are rubefacient and discutient,

and the viscid juice is painted over cuts and wounds to check bleeding and promote healing. In recent Sanskrit works the seeds of *Croton Tiglium* are described as heavy, mucilaginous and purgative, useful in fever, constipation, enlargement of the abdominal viscera, ascites, anasarca, cough, etc. *Kamala* is described, in the Nighantas, as useful in removing phlegm, bile, stone, worms, enlarged glands, boils, etc., and the leaves are said to be astringent and cooling. Both the root and oil of *Ricinus communis* are described by the Hindus as purgative and useful in costiveness, flatulence, rheumatism, fever and inflammatory affections.

Much curious information is found in this work concerning the use of vegetable medicines in Eastern countries; it is given to complete their history, as nearly as can be done, in relation to their botanical origin, distribution of the plants, introduction into use, synonyms in Eastern languages, preparation for the market, description, commerce, composition, etc. In all these respects the part now before us constitutes a trustworthy source of comprehensive information, as the preceding parts have proved to be.

Materia Medica of Madras. By Mohideen Sheriff Khan Bahadur, graduate of the Madras Medical College; retired honorary surgeon, Madras Medical Department. Vol. i. Madras: Printed by the Superintendent, Government Press. 1891. 8vo. Pp. 161.

The author had forwarded 954 drugs, used in the Madras Presidency, to the Calcutta International Exhibition of 1883-84, and while the catalogue for this collection was being prepared, it was decided to extend its scope, and Dr. Mohideen Sheriff made arrangements to supply, from his own observations, accounts of the medical properties and therapeutic usefulness of the different drugs. The first volume of this work is now before us, having the material arranged according to the natural orders of the plants producing the drugs, beginning with the Ranunculaceæ, and extending to the Leguminosæ, of which order only the drugs from a few species of *Acacia* are enumerated. The arrangement of each article is as follows: The heading gives the botanical name of the plant, and references to the catalogue of drugs sent to the Calcutta exhibition; it is also indicated whether the drug is recognized by the Pharmacopœia of India, or has been admitted into its non-official list, or has been introduced by the author, or is an English or foreign drug now cultivated on the Nilgiris. Then the consideration of the drug is proceeded with under the following subheadings: habitat, part used, synonyms (giving the names in use in Eastern countries, local sources of supply, price, physiological action, therapeutic uses, preparations, doses, European drugs for which they may be substituted, and remarks; under the latter we find descriptions of the drugs, comparison with other similar ones, and particulars about their application, wherever deemed necessary, more especially with regard to popular uses, the recommendations of Persian and Arabic works, etc.

The value of such a work may be easily conjectured when the wealth of India in medicinally valuable plants is borne in mind, and the personal observations of the author are taken into account. Unfortunately Dr. Mohideen Sheriff died February 21, 1891, before he was able to finish his labors on this work; but since Mr. David Hooper, the accomplished quinologist at Ootaca-

mund, has offered his aid, the completion of the "Materia Medica of Madras" has been entrusted to competent hands.

Charaka-Samhita, translated into English. Published by Abinash Chandos Kaviratna, practitioner of the Hindu System of Medicine, etc., Calcutta.

This, the oldest medical work known, was written in Sanskrit, and translations of it into several of the Eastern idioms have been published heretofore, among others by the physician who is now engaged with its translation into English, and the publication of this English version, with explanatory comments. Some twelve years ago an attempt was made by Dr. Mahendra Lal Sircar, to issue such a translation, and a portion of the work was published in a medical journal in Calcutta; but the effort was finally abandoned owing to impaired health. We believe that no translation into any European language is in existence, and the one now under way will, therefore, be the first to make that ancient work accessible to those not conversant with the languages of India.

The origin of the work dates back to the early part of the Christian era, and Arabic versions of it are known to have been in existence in the eighth century. According to a legend it originated from the sacred *Ayurveda* (Science of Life), which was communicated by Prajapati, a son of Brahman, to a learned sage, and by him to his followers. The work, as subsequently written down by Agniveṣa, was edited and corrected by Charaka whose name became henceforth connected with it. Charaka is supposed to have been a native of the Punjab, but nothing is known of the time in which he lived. The work itself is still regarded in India as very high authority, and the system of medicine taught by it is even at the present time practised by a large number of persons. Aside from the philological value, which a correct translation will undoubtedly possess, its attractiveness to the physician and the student of natural history lies in its historical character, by showing the principles upon which hygienic measures were based at that remote period, and the means then employed for preserving health and combatting disease. That many of the important remedial agents of the present day are derived from India, is well known; they have as a rule been employed there from a very remote period.

This interesting work is published in monthly fascicles until completed, the whole work costing 32 rupees to subscribers, the amount payable in four instalments.

A Practical Manual of Diseases of the Skin.—By George H. Rohé, M.D., Professor of Materia Medica, Therapeutics and Hygiene, and formerly Professor of Dermatology in the College of Physicians and Surgeons, Baltimore, etc. Assisted by J. Williams Lord, A.B., M.D., Lecturer on Dermatology and Bandaging in the College of Physicians and Surgeons; Assistant Physician to the Skin Department in the Dispensary of Johns Hopkins Hospital. Philadelphia: The F. A. Davis Company, Publishers, 1892. 12mo. Pp. viii and 303. Price cloth \$1.25.

It is unquestionably true that the discomfort or disfigurement produced by skin diseases, though as a rule not tending to shorten life, is apt to cause the patient more anxiety than many other ailments likely to be followed by dangerous sequelæ. For this reason a practical knowledge of the diagnosis and treatment of this class of diseases is of great importance to the physician, and

this is what the little volume endeavors to impart. This aim is kept in view throughout the entire work, and theoretical speculations upon pathology and etiology are limited to what appears to be absolutely necessary. This practical purpose, combined with clearness, and devoid of undue brevity, makes the book well adapted for constant use, and a valuable volume of the "Physicians' and Students' Ready-reference Series," which is issued by its publishers.

Proceedings of the Eighth Annual Convention of the Association of Official Agricultural Chemists, held at Washington, D. C., August 13-15, 1891. Edited by Harvey W. Wiley, Secretary of the Association. Published by authority of the Secretary of Agriculture. 8vo. Pp. 253.

Issued as Bulletin No. 31, Division of Chemistry, U. S. Department of Agriculture. It contains methods of analysis of commercial fertilizers, foods and feeding stuffs, dairy products, fermented liquors and sugars.

Report on the Production and Manufacture of Beet Sugar. By William Saunders, Director Dominion Experimental Farms. Ottawa: 1892. 8vo. Pp. 47.

The carefully drawn up report comes to the conclusion that "the strongest objection to the encouragement of this industry will be found in the fact that it would require, when fully developed, an annual subsidy of about \$4,000,000, for the raising of which, as long as we have free sugar, other industries must be taxed. The subsidy might, in the course of time, be lessened, but in view of all the facts presented, of the greater richness of the sugar-cane when grown in the tropics, and the probabilities of further improvements in the quality of the cane and in the process of manufacture, it is not likely that the bounty could ever be much reduced without crippling the industry."

OBITUARY.

The following graduates of the Philadelphia College of Pharmacy have recently died:

Albert P. Brown, class 1862, was born in Philadelphia in 1840, and after attending the public schools, became an apprentice at the pharmacy of Wm. B. Webb. Shortly after graduation he removed to Camden, N. J., where he established a drug store, and continued in the business until the time of his death. He took quite a prominent part in pharmaceutical matters in New Jersey, was recording secretary of the State Pharmaceutical Association from 1876 to 1884, when he was elected its president for the succeeding year, and for over eight years was secretary of the State Board of Pharmacy. He was a member of the American Pharmaceutical Association for twenty-two years; and for twenty years a member of the Philadelphia College of Pharmacy, much of the time doing service in the Board of Trustees. On the organization of the Alumni Association he served as a member of the executive board, became vice-president in 1872, and in 1878 was elected president. He devoted much of his leisure time to work with the microscope and to the photographing of microscopical objects, his productions in both these departments being characterized by scrupulous accuracy and attractive neatness. When the Alumni Association decided to afford to the students of the College the opportunity of familiarizing

themselves with microscopical work, Mr. Brown was placed in charge of this new laboratory, and it is due to his enthusiasm in this kind of work that many difficulties were surmounted, and that he remained at his post of accepted duty, though his health had become considerably impaired through an attack of the grippe, developing into tuberculosis of the throat, which disease terminated his life April 19. His widow and a son survive him. At the funeral services there were present many of his co-laborers in the College, the Alumni Association, the New Jersey Pharmaceutical Association and the Board of Pharmacy.

Augustus P. Blomer, class 1865, died in Philadelphia, April 25th, in his 51st year, of consumption. After graduating in pharmacy he studied medicine and practiced his profession successfully in his native city.

Cornelius Joseph McCarthy, class 1886, died in Shenandoah, Pa., April 16, after a lingering illness, at the age of 29 years. He was born at St. Clair, Pa., and after graduating, entered into business at Shenandoah. His widow and a daughter survive him.

VARIETIES.

Influence of purgatives on bile.—Löwenstein found (*Bull. gén. de Thér.*, Nov. 15, 1891) that large doses of aloes, rhubarb, carthartic acid, jalap, gamboge or podophyllotoxin do not increase the biliary secretion; on the contrary the last two drugs lessen it; however, in small doses, they increase the secretion. Absence of bile in the intestine lessens the purgative effects of gamboge, jalap and podophyllotoxin, and increases the effects of aloes and rhubarb.

A case of fatal poisoning by magnesium sulphate is reported by Sang in *Lancet*, No. 3558, *Med. News*, Feb. 6, 1892. A woman, shortly after taking 4 oz. of the salt dissolved in water, was seized with burning pain in the stomach and bowels, with difficulty of breathing and a sense of weakness in the extremities. There was neither nausea nor vomiting nor purging. Collapse set in and the patient died comatose.

THE AMERICAN JOURNAL OF PHARMACY.

JUNE, 1892.

SOME COMMERCIAL VANILLAS.

BY GEORGE M. BERINGER, PH.G.

Read before the Philadelphia College of Pharmacy at the Pharmaceutical Meeting,
April 26.

With the view of ascertaining the character and quantity of vanilla consumed in the United States, a circular-letter was addressed to all the known importers and the larger wholesale dealers, requesting samples and such information as they were willing to impart. Replies were received from a number, and I am indebted to Thurston & Braidich, for a sample of prime Mexican vanilla, and to Dodge & Olcott and Leo Bernard & Co., of New York, and Mr. Charles E. Hires, of Philadelphia, each for specimens of a number of varieties. I am also particularly indebted to Mr. Hires for obtaining for me the official statistics of importations in the United States.

While the home of the vanilla is Mexico and South America, its cultivation, originally greatly encouraged by the French government, has been extended by individual enterprise, till now the plant is cultivated in numerous and widely distributed countries; as, for instance, the West Indies and some of the islands of the Indian and Pacific Oceans, the essentials being a mean temperature of 75° to 80° and sufficient moisture at least during certain seasons of growth. In a circular, issued in 1890, Mr. Hires described the vanilla plant as a *parasite*, stating that "it takes its life and sustenance from the Mexican red cedar, which abounds in that country." This error is being repeated, and singularly such an authority as the *Encyclopædia Britannica* states "the plant has a long, fleshy stem and attaches itself by its aerial rootlets to trees and appears to be little dependent upon the soil for its nourishment." While epiphyte in

its character, clinging to forest trees for support, it is not parasitic, obtaining its support principally through its aerial roots, which drop to the ground and in many of the cultivations in the islands of the Indian Ocean the plants are supported for a considerable length upon rude trellises.

The products of the Java vanilla cultivations are exported to Holland and do not reach this country. The varieties entering our markets being the Mexican, Bourbon, Seychelles, Mauritius, Tahiti, South American and Vanillons, with occasionally a few pounds of unknown origin brought in by trading vessels. The products of Mauritius and the Seychelles are usually shipped to London while those from the French possessions, Reunion, Tahiti, Mayotte, etc., go to France.

U. S. Consul, Horace G. Knowles, of Bordeaux, reports (see U. S. Consular Reports, Sept., 1891, 127), as follows: "Paris, London and New York are the markets of the world for vanilla. The greater portion imported into France comes from her colonies, Guadeloupe, Madagascar (Sainte Marie), Mayotte, Reunion and Tahiti. Just what the products have been may be judged from the following table:

	Reunion.	Guada- loupe.	Mayotte.	Sainte Marie.	Tahiti.
	<i>pounds.</i>	<i>pounds.</i>	<i>pounds.</i>	<i>pounds.</i>	<i>pounds.</i>
1880,	164,289	—	—	—	—
1885,	155,548	9,532	2,640	8,800	18,350
1886,	361,587	12,100	4,774	18,260	5,500
1887,	417,230	6,820	2,596	16,610	6,600
1888,	462,660	9,044	19,195	19,195	6,490
1889,	506,462	—	—	—	7,018

Mexican Vanilla.—The finest vanilla is still produced in Mexico where it has been cultivated for nearly a century. Mr. C. E. Hires (*loc. cit.*) states that the pods are collected in the fall, November or early December, when nearly mature; the processes of curing, sorting and packing requiring from four to five months, the crop of this year reaches the market in the spring and summer of the next. The erroneous statement is still made in the U. S. Dispensatory that the fruit is collected in the spring. This is the time of flowering, but according to all authorities it will require nearly



South America.

Bourbon.

Mexico.

Wild Vanilla, Guadeloupe.



Tahiti.

Seychelles.

Mauritius.

Wild Vanilla, Martinique.

COMMERCIAL VANILLAS.

Reduced to about $\frac{3}{8}$ natural size.

six months for the fruit to be perfected. Since the extensive cultivation of vanilla in Reunion and other French provinces, the exportation of the Mexican to France has rapidly declined. At the present time, the United States afford the principal market for this product. The receipts for recent years were as follows:

1885,	806 cases,	100,750 pounds.
1886,	605 "	75,625 "
1887,	1,023 "	127,875 "
1888,	829 "	103,625 "
1889,	852 "	106,500 "
1890,	947 "	118,375 "
1891,	1,087. "	135,875 "

The crop of 1890-1891 was the largest ever grown. Prime Mexican vanilla is from 8 to 10 inches long, flattened, and about $\frac{3}{8}$ inch in diameter at the broadest part. Its upper end or end of attachment tapers gradually for about one-quarter of the length of the pod and is usually curved and slightly twisted toward the point. The lower end is but very slightly attenuated. The color is a dark-brown and the odor is pleasant, aromatic and characteristic. The surface is ridged longitudinally, the ridges being interspersed with finer striations and warty excrescences. The pod feels firmly plump and while fresh the surface is somewhat viscid, but nevertheless there is a roughness to the touch which becomes more pronounced as it gets older and drier. Acicular crystals commence to form at the ends and gradually extend over the surface. The interior is filled with numerous small black seeds and a small quantity of pulp.

Bourbon Vanilla.—The cultivation of vanilla in Reunion was commenced nearly half a century ago, and has been steadily on the increase until now probably 3,000 acres are under cultivation. In 1849 only 3 kilogrammes were exported from Reunion, in 1861 this had been increased to 40,000 pounds and in recent years has not fallen below 200,000 pounds. The quality of the Bourbon vanilla has likewise undergone considerable improvement, so much so that many of the published descriptions in the text-books do not fairly describe the product in our markets to-day. The best qualities are from $7\frac{1}{2}$ to $8\frac{1}{2}$ inches long and $\frac{1}{4}$ to $\frac{5}{16}$ inch in width at the broadest part. The lower end is but slightly attenuated and the upper gradually tapers, commencing about $1\frac{1}{2}$ to 2 inches from the point, and is twisted and turned in. In size and general appearance,

they closely resemble the Mexican and are now packed in bundles closely simulating that variety. In color they are of a dark brown, almost black. The odor is not unpleasant but is unlike the Mexican, being more like that of Tonka. The difference in odor becomes very pronounced on steeping a piece in hot water. The surface is longitudinally wrinkled, the striations being coarse and deep. To the touch the *surface is smooth and waxy* and soon *becomes covered with a coating of acicular crystals*, known in the trade as "*frost*." It is not as firmly fleshy as the Mexican. The vanillas from the Seychelles and Mauritius are commonly sold in this country as inferior Bourbon. The total imports of the three varieties in 1891 amounted to about 10,000 pounds.

Vanilla from the Seychelles and Mauritius.—These varieties are very similar in character. Samples of Seychelles examined were 6 to 6½ inches in length, not much flattened, being in many instances nearly round and only $\frac{3}{16}$ to $\frac{1}{4}$ inch in width, tapering for about one to one and a half inches to the upper end, which is generally twisted. The longitudinal ridges are broad and flattened. It is characterized by its pale color, faint odor and small size. After a time a few crystals appear on the surface, which is smooth but not as waxy as that of the Reunion vanilla. These crystals frequently assume a flat or tabular form.

The Mauritius fruit is similar to the Seychelles in color, shape and surface characters, but is generally somewhat smaller.

South American Vanilla—Recently the quantity of South American vanilla imported has been quite large. In 1891 it amounted to about 9,000 pounds. The principal outlet is most likely as an adulterant of the Mexican cut beans, as in this form it becomes a dangerous adulterant. In the entire bean the difference is easily recognized. It is from 6½ to 7½ inches in length and quite broad and flattened, being usually half inch or more wide, slightly tapering at the lower end, and at the upper quite sharply attenuated an inch or so from the point. The color is of a reddish brown and the odor is rank, resembling somewhat that of fermented molasses or rum. It is *very pulpy* and extremely resinous. The surface is distinctly wrinkled and smooth, being intermediate in feel between the Bourbon and the Mexican.

The pods appear to be collected when nearly ripe; frequently they are split, and seeds are seen all over the surface. There are

but few crystals appearing on the surface. Transverse sections showed the pericarp to be very thin at the edges and to consist largely of broken down dark reddish brown cells.

Tahiti Vanilla.—The vanilla produced in the Island of Tahiti and in the Sandwich Islands is all sold under the name of Tahiti vanilla. It is largely consumed in the Pacific Coast and Western States. Some years ago a considerable quantity was disposed of in Philadelphia among the retailers, being offered as *transplanted Mexican*.

The imports in 1891 amounted to 5,000 pounds. They are 6 to 7 inches long, broad and flat, about $\frac{3}{8}$ to $\frac{1}{2}$ inch in width. The color, odor and external markings are similar to the South American. They taper for a short distance to the lower end and are sharply attenuated and twisted toward the upper end. They are likewise very pulpy.

Vanillons.—While some few wild or uncultivated vanillas are collected in Mexico, the bulk of those entering commerce are obtained from the West Indies, Guadeloupe and Martinique being the principal places of export.

Their principal consumption is among the tobacco manufacturers, and perfumers for the manufacture of sachet powders.

They are from 4 to 5 inches in length, $\frac{3}{8}$ to $\frac{3}{4}$ or even 1 inch in diameter, frequently sharply angled, exhibiting almost a triangular shape on cross-sectioning. They are nearly the same diameter for the greater portion of their length, being attenuated at both ends. They are brown to a red-brown in color and longitudinally ridged. The transverse markings, due to their being wrapped with twine during the process of curing, give them a curious twisted appearance. They are generally split open and lack almost entirely the odor of vanillin, their odor being compared to a cross between a fermented sugar and heliotrope odor. They are devoid of any crystalline efflorescence.

[The characters of the different commercial varieties of vanilla are not all correctly shown in the cut, some of the curved ends being too angular, and the stigmatic surfaces and, in some cases, the attenuations not sufficiently distinct.]

Commercial benzoic chloride, according to Victor Meyer (*Berichte*, 1891, p. 4251) is usually contaminated with chlorobenzoic chloride, and the benzoyl compounds prepared from it often contain chlorinated derivatives, which cannot be separated by recrystallization; 1.5 per cent. of chlorine was found in one product.

CHIMAPHILA UMBELLATA AND CHIMAPHILA MACULATA.

BY JOSIAH C. PEACOCK, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.
No. 109.

This work was undertaken for the purpose of inquiring into the nature of the crystalline compound obtained by distilling *Chimaphila umbellata* with water, and to which the name *Chimaphilin* has been given.

As no information could be obtained regarding the isolation of this principle from *Chimaphila maculata*, it was decided to examine it also in the same connection. For this purpose some of the last-named species was collected near Haddonfield, New Jersey, in July, 1891. The material collected represented the plant in all stages of its growth, from first appearance above ground to fruiting.

It was thought desirable, before commencing the work on the special constituent, or product as it may be, to make a comparative analysis of the two species, and in view of the absence of an analysis of the species *maculata*, it may be especially useful.

The results stated below are for the leaves separately and for the stems and roots together.

In each species the separation of the parts was complete.

	PERCENTAGE.			
	Chimaphila umb.		Chimaphila mac.	
	Leaves.	Stems and Roots.	Leaves.	Stems and Roots.
Petroleum ether extract,	3'64	'84	2'15	'73
Stronger ether extract,	5'15	4'42	3'89	1'69
Absolute alcohol extract,	21'09	9'79	17'26	6'25
Water extract,	11'00	11'47	10'45	9'90
Alkaline (NaOH) water extract, . .	4'81	4'46	5'50	7'88
Acidulated (HCl) water extract, .	4'50	4'20	5'80	3'60
Starch,	1'91	3'34	2'51	3'59
Moisture,	14'60	12'80	13'00	12'72
Ash,	3'88	3'00	3'92	4'12
Undetermined (cellulose),	29'42	45'68	35'52	49'52
Total,	100'00	100'00	100'00	100'00

The corresponding extracts of like parts of both species were very similar in general physical properties.

The petroleum ether extracts were all distilled with water whereby crystals of *chimaphilin* were obtained.

The ether extracts of the leaves and of the stems and roots of *Chimaphila maculata*, when treated with hot water, imparted an acid reaction to that liquid. Upon making this solution alkaline with potassium hydrate and agitating with ether, there were obtained from the roots and stems some white acicular crystals, and from the leaves some resinous granular substance. That part of both extracts insoluble in water was soluble in alcohol; the solutions gave no reaction with ferric chloride, but were precipitated by alcoholic lead acetate solution.

The corresponding extracts from the same parts of *Chimaphila umbellata* were treated with hot water and the insoluble part filtered out. The aqueous solutions gave green colors and precipitates with ferric chloride. The part of the extracts insoluble in water consisted of resin soluble in alcohol.

These alcoholic solutions gave green colors with ferric chloride, and but slight precipitates with alcoholic solution of lead acetate. The alcoholic extracts were resinous in character and contained the ordinary plant constituents found at this stage of analysis.

The water extracts of all parts of *Chimaphila umbellata* contained minute quantities of tannin; the same was absent from the several parts of *Chimaphila maculata*. All four extracts were precipitated by lead acetate; the precipitates from the stems and roots of both species were decomposed by hydrogen sulphide. The solutions thus obtained appeared to contain no vegetable acids. Ether agitated with these last solutions removed in both cases small amounts of acicular crystals. The solutions were still precipitable by lead acetate. Petroleum ether and chloroform removed no crystalline substances when agitated with these solutions. Sugar and mucilage were also present in all four extracts.

The alkaline water extracts consisted mainly of mucilage and albuminoids.

Calcium oxalate and the customary organic matter were present in all the acidulated water extracts.

Starch was determined in separate portions of the different samples for analysis.

The ashes consisted mainly of calcium and magnesium phosphates with small quantities of potassium and calcium sulphates and some silica.

Chimaphilin.—This substance was first investigated by Fairbanks,

Amer. Journal Pharm., 1860, page 254, and later by Beshore, *ibid.*, 1887, 125, but neither of whom ascertained its composition.

It can be obtained by distilling commercial *Chimaphila umbellata* with water, during which process it collects in the condensing apparatus forming yellow needles, the size of which varies with the attending conditions. When thickly matted together the masses of crystals are of an orange color.

The drug distilled in this work was composed largely of stems and roots; no fruit was present.

The crystals were collected from the distillate and recrystallized repeatedly from alcohol sp. gr. .820, until a constant melting point was obtained, which was found to be 113–114° C.

The watery distillate from which the crystals were separated was neutral in reaction, of a pale, yellow color, slight odor and taste. From 1.5 to 2 kilos of freshly-gathered *Chimaphila maculata* were distilled. No solid separated in the condenser nor in the distillate, even upon allowing the latter to stand for a month to allow chance for possible formation by oxidation of other substance. In general characters the distillate resembled very closely the one obtained from the other species.

Another portion of the same collection was distilled after having been allowed to dry in the air of the room for forty days. A solid compound was obtained in the distillate upon this occasion which in physical properties closely resembled the similar substance from *Chimaphila umbellata*.

After it had been crystallized from alcohol, it was found to melt at 107–108° C. After one crystallization the melting point of the substance from the species *umbellata* was 108–109° C. The small quantity of material in the case of the *maculata* forbid further crystallization.

After separating the crystals the distillate showed much resemblance to the other distillates of previous operations.

The solubility of the needles in the distillate was very slight.

Separate parts of both species were now distilled to ascertain if it could be obtained from all. All parts (the fruit of the *umbellata* was not distilled) yielded it. The amount seemed to decrease in the ascent from the roots to the fruit, although no exact estimations were made to prove this statement.

To know of the pre-existence of the crystalline volatile substance

the mixed stems and roots of both species were extracted with petroleum ether. The exhausted residues were freed of petroleum ether and a portion of each distilled with water as the whole drug had been. No crystals were obtained, neither in the distillate nor apparatus.

The solvent was distilled from the extract of both plants and the latter distilled in the same manner, as above, with water, whereby the crystalline solid was obtained in both cases in the condenser.

A part of the petroleum ether extract of *Chimaphila umbellata* was recrystallized from alcohol by means of which light yellow crystals having the general appearance of those obtained by distillation were obtained. These crystals were subsequently distilled with water without apparent change.

These experiments prove that the substance is not obtainable from fresh *Chimaphila maculata*, but is obtained from the latter, dried in the ordinary way; hence, if it pre-exist in the dry plant, it is a direct product of a change during drying, but, if it is not pre-existent therein, it is an indirect product of the same change; its production from a product of this change being effected by the conditions of the process yielding it.

It seems reasonable to suppose that fresh *Chimaphila umbellata* may not yield it, although experiments were not made to prove this.

The crystals obtained by distilling commercial *Chimaphila umbellata* were recrystallized from alcohol sp. gr. .820. The alcoholic solutions were treated with animal charcoal which removed a small amount of coloring matter. From alcohol the chimaphilin separated in compact masses composed of yellow needles radiately arranged and which as stated above melted at 113–114° C. These needles had but little taste; but they produced a slight tingling of the tongue and fauces. They were nearly destitute of odor also. They were insoluble in water, but soluble in both ordinary and absolute alcohol, chloroform, ether, benzol, benzine, acetone and glacial acetic acid, and from the last solvent were precipitated, in crystalline form, to all appearances unchanged, upon the addition of water.

When carefully heated they sublimed and condensed again apparently unaltered from their original condition. Neither alcoholic solution of lead acetate nor of ferric chloride had any effect

upon them. Concentrated sulphuric acid gave a red color which changed to yellow with nitric acid. Nitric acid dissolved them, giving a yellow solution. Boiling caused no change in this solution, but upon the addition of water the chimaphilin was precipitated to all appearances unaltered.

Alcoholic solution of potassium hydrate gave a brown-green color. Aqueous solution of the same was without effect. These properties agree in general with those described by Beshore.

The crystals were free from nitrogen.

The substance was submitted to combustion, with the following result :

	I.	II.	Average.	Calculated for (C ₂₄ H ₂₁ O ₄) _x
C,	77.29	77.43	77.36	77.21
H,	5.63	5.65	5.64	5.63
O,	17.08	16.92	17.00	17.16
	<hr/> 100.00	<hr/> 100.00	<hr/> 100.00	<hr/> 100.00

Other Crystalline Substances.—A quantity of the ground mixed stems and roots and of separated leaves of *Chimaphila umbellata* was percolated with petroleum ether until practically exhausted. The last portions of the solvent removed from both materials considerable of a scaly, glistening finely crystalline substance, nearly white but for a small amount of chlorophyll. This was collected separately as far as possible.

The solvent was recovered, and the extracts treated with boiling alcohol. The resulting solutions were filtered through animal charcoal, which removed the chlorophyll and thereby produced red liquids.

In the case of the stems and roots this liquid was distilled and cooled alternately, by which means considerable white granular substance was separated. This was recrystallized from chloroform and consisted mainly of fatty substance and some crystalline waxy material. No crystals having separated, the liquid from which this granular substance deposited was distilled to a low bulk, but still no crystallization occurred. When the alcohol had completely evaporated, there remained a thick amber-colored, fatty residue which readily mixed with alcohol.

The red liquid which contained the constituents of the leaves removed by petroleum ether was distilled to a small bulk, and upon cooling it separated a nearly solid mass of crystals and other

substance. The mass was treated with hot alcohol which separated a quantity of substance not very readily soluble in that liquid. This substance was collected and will be mentioned below. The alcoholic solution of the crystals, which were mixed with the last-mentioned substance, was distilled to a low bulk, when a semi-solid residue of amber color resulted upon cooling. This residue was treated with cold alcohol, whereby a large amount of it was separated as a white, waxy substance. The cold alcoholic solution of the remainder of the residue, when distilled to a small amount, did not crystallize. The residue, upon evaporation, resembled the last preceding one, and was treated in the same manner with cold alcohol, by which means more of the waxy substance was excluded. This procedure was repeated until no more separation could be made, as the whole residue mixed with alcohol, as did the corresponding residue from the stems and roots.

The concentrated alcoholic solution of it did not crystallize, but when the solvent had entirely evaporated and after standing for about a week, crystallization took place in the fatty residue. The crystals had the appearance of chimaphilin, but could not be separated from the residue.

That portion of the first mass of crystals obtained from the red liquid, which was insoluble in hot alcohol, was washed with that solvent to remove color, and then recrystallized from chloroform. After this treatment they were readily crystallized from hot alcohol sp. gr. .820; from which solvent they were obtained white and arranged in radiate and stellate groups which interlaced. This substance was also obtained from the stems and roots by extracting the animal charcoal, used to decolorize the alcoholic solution of the petroleum ether extract, with boiling chloroform, which when distilled off left the crystals in white matted masses.

The white waxy substance, separated by treating the amber-colored semi-solid mentioned above with cold alcohol, was washed with the same, in which it was quite soluble. It was subsequently recrystallized from small volumes of that solvent boiling hot. By this treatment the substance was obtained in white needles radiately arranged in tufted masses, but mixed with a small amount of the interlaced substance mentioned above, it having crystallized from the mother liquor of the tufted crystals, and from which it was found quite tedious to separate it.

The scaly, glistening crystals, mentioned as having been extracted from both the mixture of stems and roots and from the leaves by the last portions of petroleum ether, were treated with alcohol to remove chlorophyll and afterward washed with cold chloroform which gave them nearly white. They were then recrystallized from the same solvent heated to boiling, from which they were obtained entirely white. Alcohol dissolved considerable of them, owing, no doubt, to the presence of the chlorophyll, for when further purified they were found to be almost insoluble in it.

Like chimaphilin, the three crystalline substances enumerated above contain no elements other than carbon, hydrogen and oxygen.

Matted Crystals.—These were white needles having a satiny appearance due to the radiate arrangement in which they crystallized. They melted at 153° C. When heated on platinum foil they fused and then passed off in white clouds. They were nearly odorless and tasteless, insoluble in water, soluble in alcohol, chloroform, glacial acetic acid, benzol, benzin and ether. Alcoholic solution of ferric chloride caused no change in color. Concentrated sulphuric acid alone gave a red color, and with potassium bichromate a purple color which changed to green. Cold nitric acid seemed to have no effect, but hot acid caused nitration or oxidation (indicated by the evolution of red fumes), the product of the change being precipitated by water.

Tufted Crystals.—White needles radiately arranged in tufted masses. They melted at 166 – 167° C., but owing to admixture with matted crystals showed signs of melting at 160° C. They were odorless and tasteless, insoluble in water, soluble in alcohol, chloroform, benzin, benzol, ether and glacial acetic acid. Concentrated sulphuric acid gave a red color which was destroyed by water. Cold nitric acid was without effect, but like the crystals just preceding, they were changed by hot nitric acid into a substance precipitable by water. The crystals absorbed bromine. Ferric chloride caused no change. Alcoholic solution of potassium hydrate brought about no change in color. They reacted like the preceding crystals, with sulphuric acid and potassium bichromate.

Glistening Crystals.—They are obtained, as is described above by recrystallization from boiling chloroform. The crystals were compacted together to form crusts. They did not melt at 250° C.,

but when heated on platinum foil fused to a clear liquid, and then volatilized in white clouds. They were odorless and tasteless, insoluble in alcohol except, as above stated, in the presence of chlorophyll, sparingly soluble in cold absolute alcohol and chloroform, but dissolved in both liquids when boiling; the crystals readily dissolved in ether, benzol and benzin. Sulphuric acid gave a yellow color, which was changed to red by nitric acid. Neither alcoholic nor aqueous solution of potassium hydrate caused a change of color. Cold glacial acetic acid did not dissolve the crystals to an appreciable extent, but they were freely soluble in it when hot, and from this solution were precipitated apparently unchanged by water. Boiling nitric acid showed no evidence of action upon it. Sulphuric acid and potassium bichromate gave a purple color, changing to green, as the action continued.

Owing to the small amount of this substance obtained, the recrystallizations could not be carried to a point to justify the calculation of a formula from the results obtained by an ultimate analysis. However, for sake of satisfaction, a combustion was made of it, the following results being obtained :

Carbon,	84.05
Hydrogen,	11.72
Oxygen,	4.23

The special characters of this substance, then, are as follows: High melting point, stability, slight solubility in alcohol, high percentage of carbon and a low percentage of oxygen which would give the compound a very complex formula. The oxygen, of course, was estimated indirectly, and its presence may be due to admixture of this with other substances, which would also lower the amount of carbon in the result obtained by combustion.

Until this substance is further purified, investigation of it must be considered as incomplete. However, the properties of it when generally considered, have suggested the idea that it may possibly prove to be one of those solid hydrocarbons occurring in plants which were mentioned for the first time by Helen C. De S. Abbott and Henry Trimble in this journal for July, 1888.

Solubility, behavior towards reagents and other properties distinguish these three crystalline substances from all previously known ones occurring in the Ericaceæ.

The above investigations have been made under the supervision of Professor Henry Trimble, to whom the writer is indebted for the *Chimaphila umbellata* used.

MYRICA ASPLENIFOLIA.

BY JOSIAH C. PEACOCK, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy,
No. 110.

While making some determinations of tannin in the moist rhizome of this plant, it was concluded to perform an analysis of it also.

Moisture was present to the extent of 12.94 per cent. Upon ignition there were obtained 2.83 per cent. of ash, consisting of potassium, calcium and iron in combination with sulphuric, phosphoric and carbonic acids accompanied by silica. The carbonates were insoluble in water.

When treated with petroleum ether, .55 per cent. of fat and two waxy substances were removed; the latter differed from each other in solubility in absolute alcohol. One of them crystallized in square plates.

Stronger ether removed 1.11 per cent. of extract having a narcotic odor. It contained no gallic acid, nor could alkaloids or glucosides be detected. When the extract was dissolved in absolute alcohol and that solution allowed to evaporate spontaneously there separated a resinous varnish-like substance on the side of the beaker, while on the bottom of the vessel a yellow granular powder was obtained.

The color was due to resin like that on the side of the beaker. It was removed by alcohol, which did not have any solvent action on the white granular powder which remained after this treatment. This last substance was also insoluble in aqueous solution of potassium hydrate. It did not melt at 240° C.; but when heated on platinum foil it melted to a clear liquid, which burnt with a luminous sooty flame. The resin contained in the extract was soluble in alcohol. This solution gave a green color with ferric chloride and was precipitated by water, more readily when the latter contained hydrochloric acid.

Absolute alcohol extracted 2.24 per cent. of the rhizome in the

form of a red-brown porous astringent substance. Seventy-five per cent. of this was soluble in water, forming an acid solution which contained .69 per cent. of the rhizome in tannin and .36 per cent. in glucose. That part of the extract insoluble in water was soluble in alcohol and also in dilute ammonium hydrate.

Water extracted 6.65 per cent. of organic solids composed of .57 per cent. of tannin; .6 per cent. of mucilage; 3.98 per cent. of glucose and 1.10 per cent. of saccharose.

Dilute alkaline (NaOH) water dissolved 11.52 per cent. of vegetable solids consisting of 4.12 per cent. of mucilage and albuminoids. Phlobaphenes were also present.

Weak acidulated (HCl) water removed 8.62 per cent. of total solids composed of 4.62 per cent. of ash and 4.02 per cent. of organic matter. Calcium oxalate was present in small amount.

Starch determined in a separate portion was found to amount to 9.05 per cent.

Tannin in the Fresh Rhizome.—Two lots of the rhizome were collected, one in January and the other in June, 1891. Both were estimated in the moist condition. Twenty grams were used in each case to make a litre of decoction. Both of these decoctions were yellow in color, when viewed in bulk, turbid, and had but slight odor, and reaction, and a weakly astringent taste. Both gave blue precipitates with ferric salts. The decoction made from the lot collected in January, after standing for two days, gave a green precipitate with ferric chloride with which, when fresh, it had given a blue one.

The tannin was estimated gravimetrically, using gelatin and alum solution to precipitate it. The precipitates in both cases were flesh colored. The filtrate from the precipitate of the January lot was clear and colorless, and from the June supply clear and light yellow.

The following summary of the estimations gives the amount of tannin in the "moist" state and, after allowing for the moisture present, which is also stated in the table, the amount present in the "absolutely dry" rhizome. The percentages of tannin stated under the head of "moist" are the averages of two or three closely agreeing results.

1891.	Tannin in Moist Rhizome.	Moisture.	Tannin in Absolutely dry Rhizome.
January,	2.43	35.50	3.77
June,	3.43	49.55	6.79

Gallic Acid.—A trace of this substance was found in the January sample; that collected in June, showed no evidence of it.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

The so-called mercurio-ammonium salts obtained as black insoluble powders upon the addition of water of ammonia to mercurous salts are *not* mercurio-ammonium salts, but *mixtures* of *metallic mercury* and *mercuri-ammonium salts*; the action of ammonia upon calomel is represented by the following equation: $2\text{Hg}_2\text{Cl}_2 + 4\text{NH}_3 = \text{NH}_2\text{Cl}, \text{NH}_4\text{Cl} + \text{Hg}_2 + 2\text{NH}_4\text{Cl}$; one-half of the mercury present in the mercurous salt being separated as metallic mercury. These results were discovered by treating the black precipitates with concentrated solutions of ammonium sulphate or nitrate containing some free ammonia which dissolved the mercuric salt, leaving undissolved the metallic mercury.—L. Pesci (*Gazz. chim. Chem. Ztg. Rpt.*, 1892, 142).

Oxygenated constituents of several volatile oils.—*Oil of Bergamot* by ultimate analysis yielded 78.53 per cent. carbon and 11.17 per cent. hydrogen; distilled under a pressure of 15 mm. decomposition is avoided and there remains as a residue about 5 per cent. *bergaptene*; the first fraction 60–65°, about 40 per cent. has a lemon odor and consists of almost pure limonene, $\text{C}_{10}\text{H}_{16}$; at 77–82° the fraction consists principally of *dipentene*, $\text{C}_{10}\text{H}_{16}$, about 10 per cent.; the third fraction of about 25 per cent. distilling between 87–91° has an odor resembling that of the oil (but to which the characteristic odor is not due) and consists of an unsaturated alcohol, *linalool*, $\text{C}_{10}\text{H}_{18}\text{O}$; the fraction 99–105°, approximated 20 per cent., had the pronounced bergamot odor, and was found to consist of *linalool acetate* $\text{C}_{10}\text{H}_{17}\text{O}.\text{C}_2\text{H}_3\text{O}$.

Oil of Petitgrain.—The examined oil was partly of French, partly of South American origin; it yielded by combustion 76.47 per cent. carbon and 11.14 per cent. hydrogen; the chief constituent (about 70 per cent.) boils at 102–106° under a pressure of 15 mm., has an agreeable, peculiar odor, has the composition $\text{C}_{10}\text{H}_{17}\text{O}.\text{C}_2\text{H}_3\text{O}$, and is called *aurantiol acetate*. From this ester was prepared by saponification, *aurantiol* $\text{C}_{10}\text{H}_{18}\text{O}$; it is an unsaturated alcohol, has a peculiar odor, combines with four atoms of

bromine, boils at $93-95^{\circ}$ (15 mm. pressure), is *lævogyre*, and at 20° C. has the specific gravity 0.8691. Besides this ester there are present in the oil a higher boiling *sesqui-terpene* and other oxygenated constituents which naturally modify the odor of the *aurantiol acetate*.

Oil of Lavender, of English origin, contained 77.53 per cent. carbon and 11.47 per cent. hydrogen; the very first portions of the distillate (15 mm. pressure) contained terpenes, among which *limonene* was identified; the principal fraction, $85-91^{\circ}$, consists of an unsaturated alcohol, $C_{10}H_{18}O$, called *lavendol*, which has a specific odor, a density of 0.8672 at 20° C. and is *lævogyre*; at $97-105^{\circ}$ a fraction (about 10 per cent.) was obtained, which proved to be *lavendol acetate*, specific gravity 0.8972 at 20° and *lævogyre*; higher boiling constituents were *sesqui-terpene* and other oxygenated products to which in part is due the characteristic odor of the oil.

The physical and chemical properties of *linalool*, *aurantiol* and *lavendol*, which so closely agree, suggest that they are identical; by reduction they yield aldehydes or ketones of the formula $C_{10}H_{16}O$, having the odor of *geranial* and from which they cannot be positively distinguished. The alcohols, under various influences, retain their characteristic odor and certain physical differences, so that they at present cannot be considered as being identical.—F. W. Semmler and F. Tiemann (*Berichte*), *Chem. Ztg.*, *Rpt.*, 1892, 147.

Spiræa Ulmaria, L.—The dried flowers by distillation yielded *salicylic acid*, *salicyl-aldehyde* (chief constituent), *methyl salicylate* (minute quantity) and an aromatic liquid having the odor of *coumarin*. The fresh fruit yielded the first three compounds, but here the *methyl-salicylate* was the chief constituent and only a minute quantity of the aldehyde was obtainable. The dried roots furnished traces only of aldehyde, but considerable acid and chiefly *methyl salicylate*. From the fresh roots were isolated only traces of aldehyde, much acid and absolutely no *methyl salicylate*. Attempts made to isolate these principles by solvents indicate that the flowers contain the acid and traces of *methyl salicylate* preformed, but no aldehyde; the roots, especially the dried, contain the acid and *methyl salicylate* and but little aldehyde. The results point to the presence in the flower of a substance which by decomposition yields the aldehyde; treated with ether, cold alcohol, boiling alcohol, water, alcohol and lime, and acidulated alcohol,

mere traces of aldehyde were obtainable by distilling these solutions, indicating the difficult solubility of the substance; the insoluble residue distilled with acidulated water gave a distillate which appeared to contain the full quantity of aldehyde. These experiments conclusively prove that the aldehyde is produced by the action of a ferment upon one or more substances, since treatment with alcohol and subsequent distillation with water failed to give more than traces of aldehyde (this because the alcohol coagulated the ferment); distillation with acidulated water then effected the decomposition of the substance with production of the aldehyde. An impure substance was obtained from the flowers which did not reduce Fehling's solution until after boiling with dilute acid; this behavior would speak for the presence of a glucoside which by decomposition produced the aldehyde—salicin was not found directly or indirectly in the flowers. This investigation also disclosed that the odor of the oil of spiræa ulmaria did not depend upon the presence of salicyl-aldehyde, but upon the presence of methyl salicylate, vanillin and coumarin; of these only the last mentioned was not positively identified.—Dr. Schneegans and J. E. Gerock, *Journ. der Pharm., Els.-Lothr.*, 1892, 3 and 55.

Solution of Strontium Lactate.—44.84 grams of strontium nitrate (previously washed repeatedly with 96 per cent. alcohol to remove calcium nitrate) are dissolved in one litre of distilled water and 10 grams dilute sulphuric acid added (this precipitates barium salts that may be present along with some strontium); after filtering the filtrate is mixed with a solution of sodium carbonate (60 grams in a litre), the strontium carbonate collected upon a filter, thoroughly washed, transferred to a tared beaker, 36 grams pure lactic acid diluted with 200 cc. water added, solution effected by gentle warming, and lastly diluted with water to 551 grams. The resulting solution contains 10 per cent. of anhydrous strontium lactate.—A. Thumann, *Journ. der Pharm., Els.-Lothr.*, 1892, 84.

Assay of Chlorine Water.—To determine if this preparation is of pharmacopœial strength 0.16 gram (more exactly 0.1558 gram) potassium iodide is placed in a glass-stoppered flask, dissolved in a little water, and, after taring the flask, weighing into it 50 grams chlorine water; if, after agitation, the liquid remains perfectly clear and without separation of iodine, the preparation contains 0.4 per cent. of chlorine; the presence of free iodine indicates an inferior,

whilst the presence of free chlorine after agitation indicates a superior preparation. The following reaction forms the basis for the test: $\text{KI} + (\text{Cl}_2)_3 + 3\text{H}_2\text{O} = \text{KIO}_3 + 6\text{HCl}$.—Dr. L. Winkler, *Phar. Post*, 1892, 477.

Lactic Acid Bougies for the treatment of tubercular fistula are made by melting over a moderate fire 50 each of gelatin, water and lactic acid, and then, after the addition of 30 menthol, pouring into moulds which are to be kept on ice for 24 hours and then placed in a desiccator (a metal box with double bottom, the inner one perforated) over fused calcium chloride for 8–10 days, when the proper consistency is attained; the bougies now contain about 40 per cent. lactic acid and are prevented from absorbing moisture either by coating with collodion or by immersion in oil or benzin containing 30 per cent. menthol. By replacing the gelatin with starch or dextrin the bougies become harder but lose elasticity; the menthol is added to prevent the painfulness of the lactic acid applications. The bougies coated with collodion, before being applied, have an end cut off obliquely so as to allow the liquefaction of the mass; after several days the collodion-film can be removed from the fistula.—Dr. Zippel (*Wr. med. Bl.*) *Pharm. Post*, 1892, 342.

Chloroform.—The sulphuric acid test for the purity of chloroform as given by M. C. Traub (*Am. Jour. of Pharm.*, 1892, 142), critically examined, proved that a pure chloroform is not perceptibly altered by the treatment. Five samples answering the requirements of the Pharm. Germ. III were submitted to the test: 20 cc. each of chloroform and concentrated sulphuric acid were placed in dark, glass-stoppered bottles and agitated frequently during each day of the trial; at intervals of eight days one cc. of the acid was removed, diluted with 5 cc. water, 1 cc. $\frac{n}{10}$ silver nitrate solution added and the effect observed. At the end of first eight days an examination of the atmosphere in the bottles was made by immersing a rod moistened with ammonia to determine if hydrochloric acid was liberated.

Make.	Sp. Gr.	Ammonia Test.	Silver Test after 8 Days.
I. Pictet,	1.4879	almost invisible clouds.	{ almost imperceptible opalescence.
II. M. C. Traub, .	1.4864	“ “	perfectly transparent.
III. Duncan Hock- hart & Co., }	1.4980	“ “	like I.
IV. C. H. B.,	1.4966	distinct clouds.	“
V. Puriss. extra H.,	1.4897	heavy clouds.	distinct opalescence.

The silver tests set aside for eight days showed no change in I and II, but in the others a precipitate had formed; V was rejected at this stage, and the other four examined again after a lapse of eight days (24 days from the start) showed no change with the silver test, but in IV a distinct phosgene odor was recognizable, while in III the sulphuric acid was tinged yellow; after 32 days the silver test showed opalescence in I, III and IV, while II remained unchanged; after allowing these tests to stand eight days all but II, which still remained clear, contained slight precipitates. From these results it appears that it is possible to prepare pure chloroform by other than Pictet's method, the sample II even being purer according to this test than chloroform Pictet.—*Schwz. Wochenschr. f. Chem. u. Pharm.*, 1892, 153.

Arabol-gum is an artificial product containing water 15.12 per cent., ash 0.81 per cent., maltose 24.23 per cent., dextrin 54.48 per cent., starch 4.18 per cent., acidity expressed in percentage of KOH 0.43 per cent. The following method gives a similar product: 100 gm. wheat starch are heated with 500 cc. water containing 10 gm. oxalic acid in a water-bath at 90° C. for four hours, stirring occasionally; after neutralizing with powdered marble and filtering, the transparent yellow filtrate is evaporated and dried in a water-bath until the mass retains only 14 per cent. moisture.—*F. M. Horn, Pharm. Post*, 1892, 525.

Thiolinic Acid is, according to a patent application, made by heating 6 parts linseed oil and 1 part flowers of sulphur until a decided frothing takes place (at about 230° C.), allowing to cool and heating this sulphur-oil on a water-bath at 80–100°, with an equal weight of sulphuric acid sp. gr. 1.840 until evolution of sulphur dioxide ceases and a uniform liquid results; this is poured into a large quantity of water and thoroughly manipulated so as to remove the excess of acid, collected upon a strainer and dried. This constitutes the thiolinic acid, a friable, amorphous mass of dark greenish-brown color, sintering at 65–70° C., and containing about 14.2 per cent. sulphur; it is insoluble in water, but is soluble in alkalis and alkaline carbonates, from which solutions sodium chloride precipitates the salts; it is intended as a therapeutic agent.—*Apotheker Ztg.*, 1892, 227.

Analgene, or more exactly orthooxethyl- and monoacetyl-amido-chinoline, is the result of an endeavor to unite the acetamido and

oxyethyl groups with a nucleus also having antipyretic effect, so as to produce a new body of corresponding physiological power. The formula is $C_9H_5(OC_2H_5)(NHC_2H_3O)N$. The preparation is given in doses of one gram to alleviate rheumatic pain.—*Apotheker Ztg.*, 1892, 141.

Kamala.—Professor Flückiger recently received from Dr. M. Greshoff, of Java, ripened capsules of the kamala-plant which air-dried weighed 207.10 grams; from these were obtained 12.74 gm. seeds, 22.66 gm. kamala (containing 3.92 per cent. moisture) and 171.70 gm. capsule integuments; the kamala therefore amounted to 10.79 per cent. and was found to yield from 1.3 to 1.5 per cent. ash, depending upon the quantity taken for the determination. The integuments incinerated yielded 4.19 per cent. ash, so that these, if admixed, would not account for the high percentage of ash in the commercial article; the undesirable parts of the capsule can be so readily separated by sifting that it is not possible to see how the "method of collecting" can increase the percentage of ash unless the collector use bolus or other adulterating agent.

Attention is called to the similarity in usage of waras by the Arabs and Africans, and to the open adulteration of the same for hundreds of years past, so that it is not considered to be an adulteration but a sacred custom.—*Arch. der Pharm.*, 1892, 2.

Bitter principles.—*Menyanthin* from *Menyanthes trifoliata* was extracted by treating the powdered herb with ether, then with 98 per cent. alcohol; the solutions were evaporated to extract consistency, exhausted with water at 50–60° and these aqueous solutions separately treated because of the presence of tannin only in the one from the alcoholic extract. This was first precipitated with lead acetate, filtered, the excess of lead separated with H_2S , warmed to remove the excess of H_2S and the free acetic acid neutralized by digestion with barium carbonate, and filtered. The aqueous solution from the ether extract was agitated with moist aluminium hydrate and filtered; both filtrates were now treated in the same manner, concentrated in vacuo, mixed with sand, evaporated to dryness, extracted with alcohol, this solution concentrated and impurities precipitated by addition of ether, and the solution of the bitter principle further purified by treatment with animal charcoal. Both extracts contained the same principle which was of a yellow color, neutral reaction and pure bitter taste; it was easily soluble in alcohol

and boiling water, much less in cold water and ether. Although free from nitrogen, formula $C_{33}H_{50}O_{14}$, it gave precipitates with tannin, Mayer's reagent, iodine, phospho-molybdate of sodium, and bismuth-potassium iodide; auric chloride and Fehling's solution were reduced; baryta and lime-water, also dilute acids decomposed it, its solution losing the bitter taste. Its decomposition products are an aldehyde- and phenol-like body, called menyanthol $C_7H_{11}O_2$, a resinous product and a lævogyre carbohydrate.

Erythrocentaurin from *Erythræa Centaurium* was obtained exactly as above. This principle, except for its color, which was almost white, had the same physical properties as menyanthin; it also resembled it in its behavior toward the alkaloidal and decomposing reagents; it, however, had the formula $C_9H_{14}O_5$, and in its decomposition a dextrogyre carbohydrate was produced.—Karl Leudrich, *Arch. der Pharm.*, 1892, 38 and 48.

Absinthiin—This was prepared from the ethereal extract by agitation with water, this solution purified by agitation with freshly-precipitated aluminium hydrate, and extracting the bitter principle by agitation with ether, evaporating and drying over sulphuric acid; the aqueous solution can also be evaporated in vacuo. Absinthiin is amorphous, forming a pale-yellow powder of intensely bitter taste; it melts at $65^\circ C.$, has the formula $C_{15}H_{20}O_4$, and is soluble in water, alcohol and ether. It is a glucoside, being decomposed by boiling with water and dilute acids into dextrose, a volatile constituent (volatile oil) and into a solid resinous substance belonging to the aromatic series, having probably the formula $C_{21}H_{26}O_6$ and reacting like an oxyacid.—O. Senger, *Arch. der Pharm.*; 1892, 94.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

Action of Hydrocyanic Acid on Calomel.—Cheynet (*L'Union pharm.*, 1892, 153) endeavored to determine the cause of the toxicity of this mixture. It is known that on mixing these two compounds, a certain quantity of mercury is liberated, and the liquid becomes decidedly acid. Scheele explained the greater toxicity of the mixture by assuming the formation of mercury cyanide; this, however, was contradicted by Bussy and Buignet, who distilled the mixture

and found in the residue bichloride of mercury, and in the distillate hydrocyanic acid. To arrive at some conclusion as to the cause of the acidity of the mixture the author used tropeolin. This substance is not acted on by either alone, but on mixing, a violet red color appears, showing the presence of some free stronger acid (hydrochloric acid). To obtain the other body formed in the reaction, the author added silver carbonate when carbonic acid (misprint in *loc. cit.*, reads hydrochloric acid) was eliminated; after filtration, evaporation and crystallization cyanide of mercury, with a trace of cyanide of silver was obtained.

Boric Acid.—P. Carles (*Rép. de Pharm.*, 1892, 102) found two kinds of boric acid in the pharmacies of France, the one in flakes, which is generally known, and the second a prismatic variety which differs markedly from the first. The ordinary kind forms pearly flakes or hexagonal plates, is light, and is unctuous to the touch while the other variety is in prisms, heavy and does not possess the unctuous touch. The author found that (1) the solubility in strong alcohol is the same with both varieties; (2) the insoluble portion, about 1 per cent., is principally sulphates in the flakes, and chlorides in the prismatic acid; (3) there is usually a larger proportion of an empyreumatic organic body in the prismatic variety than in the other; (4) both varieties when purified crystallize in plates. The author prepared some of the boric acid from borax, using in the one case sulphuric, and in the other hydrochloric acid. In the first case the boric acid crystallizes on the surface in plates, while in the second it crystallizes in the bottom of the receptacle. If the flaky acid be crystallized from a solution containing a chloride or hydrochloric acid it will separate in the form of prisms. The crystals in this case are separate, and as they can be obtained quite small in size the purification is not so difficult, since they cannot have much of the mother liquor adhering after the first washing. Another point in which these varieties differ is in the readiness with which they are reduced to powder, the prismatic variety powdering very easily.

Strontium Chloride.—According to A. Etard (*Compt. rend.*, cxiii, 856) the aqueous solution deposits below 40° C. needles of $\text{SrCl}_2 \cdot 6\text{H}_2\text{O}$. Between 90° and 130° C. lamellæ of $\text{SrCl}_2 \cdot 2\text{H}_2\text{O}$ are formed, and at 75° both needles and lamellæ are deposited. Heated to 145°, the saturated solution deposits at first

needles, probably of the composition $\text{SrCl}_2\text{H}_2\text{O}$; and afterwards lamellæ of the dihydrate.

The absence of barium from strontium salts is best determined, according to Jungfleisch, by the test recommended by Lüdeking, by adding to the solution of the salt a few drops of a saturated solution of neutral potassium chromate and of acetic acid, and heating; in the presence of barium a precipitate of barium chromate will make its appearance in a few minutes. In the place of the neutral chromate, a solution of potassium bichromate may be used together with sodium acetate, the mixture to be heated.—*Four. Phar. Chin.*, Jan., 1892. See also March number, p. 136.

Action of Sodium Hypobromite upon Glass.—The solution of sodium hypobromite used for the estimation of urea is recommended to be preserved in yellow or red bottles. After keeping such a solution in a red bottle, Denigès observed it to have a red instead of the proper yellow color, and ascertained this change to have been due to a small quantity of sodium permanganate formed by the action of the hypobromite upon the manganese present in the glass; but this coloration did not notably affect the solution so as to render it unfit for the estimation of urea.

Solution of Chlorinated Soda.—Herison and Lefort propose to prepare this solution from chlorinated lime by decomposing it with sodium sulphate in place of the carbonate, otherwise following the usual process of precipitation and decantation of the clear liquid. Such a solution has the advantage of being neutral, instead of having an alkaline reaction.

Solution of Antimonious Chloride in Sodium Chloride.—On treating an excess of antimonious oxide with strong hydrochloric acid in the cold, a saturated solution of antimonious chloride in free acid is obtained. H. Causse (*Comp. rend.*, cxiii, 1042) saturated this acid liquid with sodium chloride, and observed that a considerable amount of sodium carbonate may be added to the solution without causing a precipitate. By titration with soda it was determined that the total amount of free HCl may thus be neutralized, with the result that antimonious chloride remains dissolved in an aqueous solution of sodium chloride.

Phenacetin and Quinine.—In the examination of a urine for alkaloids by the method of Stas-Otto, Drs. Sestini and Campani

(*Bollet. farm. Milano*, through *Four. de Phar.*, 1892, 95) obtained reactions which induced them to investigate the influence of phenacetin upon some of the tests for quinine. They arrived at the following facts: (1) Phenacetin prevents the fluorescence of quinine salts in acid solution; (2) chlorine water produces an azure blue color in a solution of a mixture of these bodies; (3) vapors of bromine produce in a slightly ammoniacal solution a characteristic green color; (4) bromine vapor produces in a dilute solution only a yellow color, excess of bromine forms in a concentrated solution a yellowish precipitate which dissolves with an emerald green color in ammonia. (5) To obtain the characteristic green color spoken of under 3, the authors proceed as follows: Bromine vapor is led through a solution until a precipitate begins to form, at which time ammonia water is added drop by drop. The green color changes slowly to a violet. If the liquid is then shaken with ether, the mixture separates into two layers, the upper being bluish and the lower green.

Light and pure Quinine Sulphate.—P. Carles (*Bullet. Soc. Chim.*, Feb. 20, 1892) makes use of ammonium sulphate in preparing a light sulphate of quinine in the pure state. He mentions two methods:

(1) Quinine sulphate is dissolved in 30 parts of boiling water, the heat removed and ammonium sulphate in large crystals put into the solution. The liquid is then stirred to dissolve the ammonium sulphate and also to disseminate the first feathery crystals through the liquid. It is then set aside and the operations ended in the usual manner. (2) It is preferable to saturate, at a temperature of 50° or 60° C., a volume of water—not exceeding one-tenth the capacity of the crystallizing vessel—with pure quinine sulphate; after removing the liquid from the fire, the desirable quantity of ammonium sulphate in crystals is added with stirring, and the crystalline pulp which forms is well mixed in a large vessel until, in a few minutes, it becomes firm, when it is allowed to cool and finished in the usual manner. The best results are obtained by using 4 gm. of ammonium sulphate to the litre of solution.

Preparation of Acetylene from Bromoform.—A steady stream of acetylene gas is obtained, according to P. Cazeneuve (*Compt. rend.*, cxiii, 1054), by treating bromoform 20 gm. with powdered zinc 80 gm. and 2 per cent. aqueous cupric chloride. The reaction

between bromoform 10 gm. and powdered silver 50 gm., after warming, is so violent as to raise the mixture to incandescence. Replacing the silver by powdered zinc, the action should be induced by the addition of a few drops of ammoniacal solution of cuprous chloride. On operating with chloroform by these processes, no acetylene, or only a trace of it, is obtained.

Thiophene derivatives.—Two new bodies introduced into therapeutics are thiophene-sulphonic acid and thiophene biniodide. Thiophene-sulphonic acid is a white crystalline powder containing 33 per cent. of sulphur, and is proposed by Dr. Spiegler (through *Rép. de Pharm.*, 1892, 157) for prurigo in the form of a 10–20 per cent. ointment, with equal parts of vaselin and lanolin as a base. The *thiophene-sulphonate of sodium* is to be preferred to betanaphthol in cases of prurigo complicated by eczema. The *thiophene biniodide* is analogous to iodol, and forms a crystalline powder, of peculiar aromatic and not disagreeable odor. It contains 75 per cent. of iodine and 9 per cent. of sulphur. It is insoluble in water, soluble in hot alcohol, ether and chloroform. Dr. Hock recommends it as a substitute for iodoform in the form of powder or gauze.

Commercial Digitalins.—In speaking of the therapeutic value of digitalin, J. Fouquet states (*Bull. gén. Therap.*, 1892, p. 71) that of the more or less active principles of digitalis the following are soluble in chloroform, but insoluble in water: Crystalline digitalin, amorphous digitalin and digitoxin; while digitalein and German digitalin are soluble in water and insoluble in chloroform. Of these principles those of the first group are the most active, and the crystallized digitalin deserves the preference. It should be given in the full dose of 1 mgm., and if insufficient diuresis should be produced, another dose of 0.5 mgm. may be given on the next or third day.

Myrtol.—Myrtol is that portion of the oil of *Myrtus communis* distilling between 160° and 170° C. It contains cineol identical with cajeputol and eucalyptol and a hydrocarbon $C_{10}H_{16}$. It is used with some success in putrid bronchitis and pulmonary gangrene. It is partially eliminated by the respiratory way diminishing the odor, and at the same time the quantity of the expectorations. As it is also partially eliminated by the kidneys, it was proposed for the treatment of catarrhal affections of the urinary tract. It is used

in capsules containing 15–20 cgm. eight or ten being given during a day, when the patient is without fever. In the treatment of affections of the respiratory tract it may be used hypodermically. The solution used is 1 part of myrtol to 4 parts of liquid paraffin or oil of sweet almonds. Two injections of 3–5 gm. of the solution are given a day.

Iodized liquid Paraffin.—According to Dr. Crismer, liquid paraffin dissolves iodine in the proportion of 3–5 to 100, a more concentrated solution prepared by heating, precipitates on cooling. E. Sohet (*Bull. de la Soc. de Pharm. Brux.*, Jan. 15, 1892; *Rép. de Pharm.*, 1892, 106) got over this difficulty by dissolving the iodine in the smallest quantity of ether and mixing this solution with the paraffin oil.

Examination of icteric Urine for Albumin.—Dr. Grocco (*Rev. gen. ital. di clin. med.*, 1891, through *Rép. de Pharm.*, 1892, 168) finds that the reagents used for the detection of albumin in icteric urine at times produce a precipitate having the appearance of coagulated albumin, but being soluble in alcohol and not giving the biuret reaction. To avoid being misled by this reaction, it is necessary to treat the urine with $\frac{1}{20}$ or $\frac{1}{30}$ of its volume of concentrated acetic acid and putting it aside for six or eight hours at a low temperature. It is then filtered and the usual test for albumin applied. The author furthermore found that this pseudo-albuminous precipitate is composed of biliary pigments, principally biliverdin.

Elastic Crayons of Iodoform.—Dr. Guy (*Bull. de Pharm.*, Bordeaux, 1892, 58) gives the following formula for the preparation of these crayons: Glycerin, 10 drops; distilled water, 16 drops; powdered tragacanth, 1 gm.; powdered iodoform, 12 gm. Beat the gum, glycerin and water to a paste in a mortar, incorporate the iodoform, make into crayons, and dry in an oven at 40–50° C. for two hours. Heat also for half an hour some opodeldoc bottles, their corks and lycopodium. After these have cooled in the oven, introduce the crayons while still warm and stopper the vials carefully.

Method for distinguishing vegetable fibres in Silk or Wool.—This method, recommended by S. Fubino (*Il Scلمي; Revue internat. de bibliog.*, March, 1892, p. 75) is based upon the conversion of cellulose into sugar, and upon the decolorization of the coloring matter of orchil in the presence of sugar and alkali. A small piece

of the fabric under examination is made to imbibe several drops of sulphuric acid, 66° B.; after 5 or 10 minutes add 5 cc. distilled water, heat to boiling, decant the liquid, add gradually concentrated solution of caustic soda, until strongly alkaline, add a few drops of a dilute solution of extract of orchil, and heat the violet liquid for several minutes to 90°, when if cotton, flax, or other vegetable fibre was present, it will be decolorized (on exposure to the air the original color will be reproduced). Should the violet color of the liquid remain after five minutes' heating, the fabric is free from vegetable fibre, or, at most, contains but a minute proportion of the same.

REACTIONS OF COCAINE.¹

By J. C. STEAD.

The query read by the President is, "What is the best chemical test for cocaine salts?" To attempt to answer this would be presumptuous on my part, and I, in reply, can only enumerate the characteristic reactions of cocaine salts generally, and describe some of the tests which have been proposed for their identification.

The aqueous solutions of the freely soluble salts of cocaine are precipitated as follows, by—

Carbonates and hydrates of ammonia, the alkalies and alkali earths,		white.
Borax,		white.
Picric acid,		yellow.
Tannin, in the presence of hydrochloric acid,		white.
Meyer's reagent,		white.
Thresh's reagent,		brick red.
Iodine,		brick red.
Stannous chloride,		white.
Gold chloride,		pale yellow.
Platinic chloride,		yellowish flesh.
Mercuric chloride,		white.

They are not precipitated by bicarbonates or tannin.

With the ordinary color reagents for alkaloids, viz., sulphuric acid, sulphuric acid with nitric acid, sulphuric acid with sugar, sulpho-molybdic acid, nitric acid, hydrochloric acid, sulphuric acid

¹ Read before the Chemists' Assistants' Association; reprinted from *Phar. Jour. and Transactions*, April 30, 1892, p. 902.

and potassium bichromate, and ferric chloride, the alkaloid or its salts give no characteristic reaction. It has been stated that with the sulphuric acid and bichromate test cocaine gives a dirty pink, but with this I have not been able to obtain any distinct coloration.

The following are some of the characteristic reactions of which notices have been published from time to time as being useful for the identification of the alkaloid.

Cocaine treated with an alcoholic solution of potassium hydrate yields ethyl benzoate with characteristic odor.

Professor Flückiger, in a paper published in the *Pharmaceutical Journal* of March 20, 1886, draws attention to the fact that if cocaine or its salts be heated with sulphuric acid sp. gr. 1.84, white acrid vapors are given off which on cooling deposit crystals of benzoic acid. This reaction, he states, may be performed with minute quantities of the alkaloid.

Schell remarks that a mixture of cocaine hydrochloride and a small quantity of mercurous chloride moistened or simply breathed upon blackens. Atropine gives the same result, but only on heating. The alkaloid cocaine does not answer to this test, but only its hydrochloride.

Vitali proposes a test which consists in dissolving the alkaloid in $\frac{1}{2}$ –1 cc. of sulphuric acid in a porcelain capsule and adding potassium or sodium iodate or iodic acid, in the proportion equal to three times the weight of the cocaine, when on slightly heating on a water-bath light green streaks appear, then a grass green coloration, and last a dark blue.

There is a test proposed by de Silva, which was commented upon by Mr. Stark at a meeting of this Association last session. It consists in evaporating to dryness on a water-bath a solution of a minute portion of cocaine or one of its salts in nitric acid sp. gr. 1.4, and then treating the residue with an alcoholic solution of potash, when an odor similar to that of peppermint is developed. Mr. Stark, in his note, mentioned that he had tried this test with atropine, sabadilline, pilocarpine, cinchonine, eserine, veratrine, brucine, codeine, delphinine, narcotine, quinine, strychnine, and quinidine, none of which yielded a result similar to that of cocaine, though he thought the odor of the product from the latter suggested citronella rather than peppermint, and was not distinctive enough to render the test reliable. The odor that I have obtained

with this test is similar to that produced on treating cocaine with alcoholic potash. The product appears to be ethyl benzoic ether.

Mezger has suggested the following for the detection of cocaine in the presence of other bases, cocaine hydrochloride 0.05 gram dissolved in 5 cc. of water and five drops of a five per cent. solution of chromic acid added. A distinct precipitate is formed on the addition of each drop, which, however, immediately dissolves; if, now, 1 cc. of strong hydrochloric acid is added a heavy yellow precipitate of cocaine chromate is formed.

Müller also remarks that potassium bichromate precipitates the alkaloid from neutral solutions, while the normal chromate does not, and so serves to distinguish cocaine from other alkaloids. I have tried these chromate tests with aconitine, apomorphine, atropine, beberine, brucine, caffeine, cinchonine, cinchonidine, codeine, colchicine, emetine, gelsemine, hyoscyamine, morphine, pilocarpine, physostigmine, narceine, strychnine, and veratrine. Of these, gelsemine, strychnine, and veratrine behave very similarly to cocaine, so that with them the test is negatived, but with the remainder the reactions are distinct from that of cocaine.

Giesel, in 1886, proposed the following reaction for identifying cocaine. If 0.01 gram cocaine hydrochloride is dissolved in 1-2 drops of water and about 1 cc. of 3 per cent. solution of potassium permanganate added, a violet precipitate is produced at ordinary temperatures. Lyons remarks that with solutions containing less than 1 per cent. of cocaine crystals are only formed on evaporation.

In using this test I find that with aconitine, beberine, brucine, quinine, colchicine, cinchonine, emetine, gelsemine, codeine, morphine, physostigmine, pilocarpine, strychnine, veratrine, narceine, cinchonidine and apomorphine, the reduction of the permanganate is immediate, or occupies but a few minutes, whilst with hyoscyamine, atropine and caffeine, an indifference equal to that with cocaine is observed, but no precipitate of the permanganate of the alkaloid is formed. This is, in my opinion, one of the best tests for cocaine as yet published.

There are some other tests which I have not referred to because they are either useless or they do not admit of their use by the pharmacist with facility.

AGROSTEMMA GITHAGO (CORN COCKLE).¹

BY N. KRUSKAL AND R. KOBERT.

The sapotoxin of *Agrostemma* has the same composition as those of *radix saponariæ albæ* and of quillaja bark, but differs from them in its physiological properties. Hydrolysis with acids causes the formation of glucose (4 mols.) and sapotoxin (1 mol.). The corn cockle contains about 6.17 per cent. on the average.

Agrostemma sapotoxin has an irritating action on the mucous membrane of the nose, mouth and eyes; it affects the nerves similarly to that of the quillaja bark. When in solution (1 : 15,000), it dissolves blood corpuscles of both carnivorous and herbivorous animals. It appears to act differently on animals when taken inwardly, the Herbivoræ being relatively unaffected, provided that the doses are not too large and not taken for too great a length of time, whilst, on the other hand, the Carnivoræ are seriously affected and readily succumb to its action. On man it has an intermediate effect, but doses of 0.1 gram are sufficient to cause illness. The author points out that bread which the Russian military authorities provide for the soldiers may contain as much as 0.5 per cent. of corn cockle, and this corresponds with a dose of about 6 grams of corn cockle per day, a quantity which may readily produce serious toxical effects.

Kobert points out that the simple term "saponin" is not sufficient, and the source from which it has been obtained should be stated, since the several different saponins have such varying physiological actions. The several saponins appear to belong to series of compounds which have different generic formulæ. Stütz's saponin $C_{19}H_{25}(OH)_5O_5$, belongs to a series the formula of which would be $C_nH_{2n-5}O_{10}$. The lowest member of the series is isomeric with syringin, and has the formula $C_{17}H_{25}O_{10}$.

A SIMPLE METHOD OF DRAWING MICROSCOPICAL PREPARATIONS.²

BY A. HOFEWELL SMITH, M.R.C.S., L.R.C.P., L.D.S.

There has always been a certain amount of difficulty attending the use of the camera lucida, or Beale's neutral tint reflector for the

¹ *Chem. Centr.*, 1891, ii, 545-546; *Arb. pharm. Inst. Dorpat*, 6, 89-145, 146-148. *Jour. Chem. Soc.*, March, p. 350.

² *Journal of the British Dental Association; Pharmaceutical Journal and Transactions*, March 26, 1892, p. 797.

above purpose. The twisting of the head into an uncomfortable position, the great fatigue to the eyes, and the by no means easy task of viewing both image and pencil at the same time, add to the troubles of making a faithful likeness of the object on paper.

To those especially who do not possess a camera lucida, or Beale's instrument, and to microscopists generally, I recommend the following arrangement of ordinary apparatus: The microscope body is placed in a horizontal position, and the mirror removed from its substage attachment. The microscope slide having been placed on the stage, the illuminant (lamplight for choice) is "condensed" on the slide by means of a "bull's eye" in the same way as for photomicrography. Care must be taken to "centre" the light. The concave mirror is then attached to the front of the eye-piece of the microscope by a piece of thin wood or a spring, and has its surface at an angle of about 45° with the plane of the anterior glass of the ocular. The image is thus projected on to the paper beneath. No distortion will occur if the outer ring of light is *perfectly* circular. A dark cloth, such as photographers use, is thrown over the draughtsman's head and also over the body of the microscope, and all light excluded save that through the microscope lenses. Any section can thus be easily, rapidly, and comfortably drawn, and accurate representations of objects magnified up to 500-600 diameters can be obtained.

ARTIFICIAL COLORING OF CRYSTALS.¹

BY O. LEHMANN.

Senarmont discovered that salt crystals may be colored by certain organic dyes without any change in the form or homogeneity of the crystal. The author has on former occasions made similar observations with other inorganic and organic compounds, and in order to ascertain something more with reference to the conditions under which this phenomenon takes place, has now made a large number of experiments on the artificial coloration of crystals. The crystals made use of were those of certain organic acids, such as succinic, protocatechuic, and phthalic acids, and these were colored by means of different organic dyes. The author summarizes his results as follows:

The crystals always become darker in color than the solution

¹ *Zeit. physikal. Chem.*, **8**, 543-553. *Jour. Chem. Soc.*, March., p. 269.

from which they separate. They are usually observed to be surrounded by a lighter colored, or even quite colorless, layer, the coloring matter being deposited with such rapidity upon the growing crystal that the slow diffusion of the dye from the more distant parts of the solution is not sufficient to make up for the decreasing concentration in the neighborhood of the crystal.

The coloring of the crystals is in nearly all cases dichroic, a proof that the coloring matter actually enters in some way into the structure of the crystal. The remarkable rule is observed that only one of the two rays produced by double refraction is colored, whilst the other appears to be perfectly white, the colorless ray being always the one which has undergone the least refraction.

If two coloring matters are present in the solution, the presence of the one often hinders the absorption of the other. In some cases, however, the reverse takes place, and a coloring matter which alone would not be absorbed may become so when some second coloring matter is added. Change of the solvent, or the addition of other solid or liquid foreign matter, may act in a similar manner.

Different crystals are only capable of taking up certain organic dyes, so that two compounds of perfectly similar appearance may be capable of combining the one only with one, and the second only with some other dye. This fact may obviously be made available in distinguishing crystals one from another. It may also, perhaps, be applicable for the purification of certain dye-stuffs.

THE CHEMISTRY OF THE LIVER.¹

BY A. P. LUFF, M D., B.Sc., M.R.C.S.

Although I shall trouble you with as few anatomical and physiological details as possible, yet it is necessary for the comprehension of the subject that I should give you some idea as to the relationship of the liver to the alimentary canal and to the circulation in general. The liver is a large gland connected by means of the bile-duct with the upper part of the intestinal tract; it is composed of a number of small lobules, each of which may be regarded as a miniature liver, since the chemical changes occurring in the liver are the sum of the chemical changes occurring in the

¹ Read before the Chemists' Assistants' Association; reprinted from *Phar. Jour. and Transactions*, April 23, 1892, p. 884.

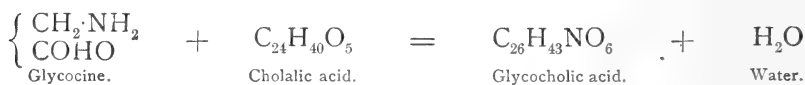
individual lobules. The liver is a very vascular organ, and is supplied with blood from two different sources; from one source, by means of the hepatic artery, it receives blood from the systematic circulation, which blood is intended for the general nutrition of its substance; or, in other words, for the repair of the wear and tear of its tissues; from another source, by means of the portal vein, it receives blood from the digestive viscera, notably from the stomach and intestines, and in this portal blood are conveyed to the liver the dissolved products resulting from the action of the various digestive juices on the constituents of food during their passage through the alimentary canal; these soluble products which result from the processes of digestion are in the liver submitted to important chemical changes, and these changes I propose to consider to-night. To recapitulate, the hepatic artery merely conveys arterial blood for the nutrition of the liver substance, whereas the portal vein, by means of its tributaries from the digestive viscera, conveys in its blood material upon which the liver exercises its elaborative action.

The substances elaborated within the liver can leave that organ by two channels, either being discharged by means of the bile-duct into the upper part of the intestines, or passing by means of the hepatic vein into the general circulation. The liver is therefore placed in the road by which portal blood conveying material from the digestive tract must pass before it can gain access to the general circulation, and it is a gland provided with remarkable chemical powers, by means of which it can transform substances that would in themselves be harmful to the organism into useful or harmless products. We have now to consider what these chemical powers are, with which the liver is provided.

The chief chemical functions of the liver are, the secretion of bile, the formation of sugar, the formation of urea and other urinary substances. As regards the first-mentioned function, viz., the secretion of bile, the liver performs the *rôle* of a secreting gland, the duct of which, viz., the bile-duct, opens into the upper part of the intestines. As regards the two other functions, viz., the formation of sugar, urea and other urinary substances, the liver is practically playing the part of a ductless gland, from which the elaborated products (sugar, urea, etc.) are carried off by the outgoing venous blood. Bile is a somewhat viscid fluid, dirty

green or reddish-brown in color, possessing a bitter taste, a slightly alkaline reaction, a sp. gr. of 1.020, and containing from 10 to 15 per cent. of solid matters. A considerable quantity of bile is being daily produced by the liver, about 50 fluid ounces being secreted in twenty-four hours by an adult man. The greater part of the specific biliary substances are manufactured by the liver, and are not simply removed in a ready-made condition from the blood. The sodium salts of the bile acids form two soaps, viz., sodium glycocholate and sodium taurocholate.

Glycocholic Acid ($C_{26}H_{43}NO_6$) is a compound of glycocine and cholalic acid, the union of these two substances taking place in the liver cells.

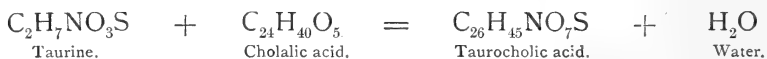


Glycocine is formed in the intestines during the pancreatic digestion of proteids; but as to the production of cholalic acid nothing is known, except that it is probably produced within the liver cells.

Glycocholic acid is especially abundant in the bile of herbivora and of man; and the amount is increased in the bile of man by a vegetable diet. In the intestines the glycocholic acid of bile is decomposed, taking up water and splitting into glycocine and cholalic acid.

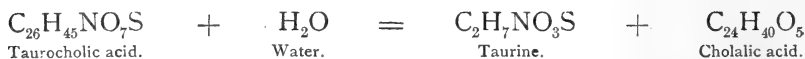


Taurocholic Acid ($C_{26}H_{45}NO_7S$) is a compound of taurine and cholalic acid, the union of these two substances also taking place in the liver cells.



Taurine is formed in the intestines during the pancreatic digestion of proteids.

Taurocholic acid is especially abundant in the bile of carnivora and is also present in the bile of man. In the intestines it takes up water and splits into taurine and cholalic acid.



To separate the bile salts, evaporate the bile to a quarter its

bulk, make into a paste with animal charcoal, dry at 100° C. and extract with alcohol; from the alcoholic solution the bile salts may be precipitated by adding ether in excess. Pettenkofer's test for the bile acids consists in the development of a red color on the addition of strong sulphuric acid and a concentrated solution of cane sugar. The two bile acids may be separated from each other by dissolving the sodium salts of the two bile acids in water, and adding neutral lead acetate, when the glycocholate of lead is precipitated. Filter, and add to the filtrate basic lead acetate and ammonia, when the taurocholate of lead is precipitated. From the lead salts the bile acids can be liberated by means of sulphuretted hydrogen. The glycocholate and taurocholate of sodium are found very sparingly in the fæces, and are only represented to a slight extent in the urine. It is calculated that about seven-eighths of these bile salts are re-absorbed from the intestines and returned to the liver, in the form of the simpler constituents, glycocine, taurine and cholalic acid, into which they have split up in the intestines, these bodies being again united within the liver to form the bile salts. If, therefore, the liver normally depends upon the recovery from the intestines of so large a proportion of its bile salts, is it to be wondered at that the liver becomes so quickly deranged, as it does during an attack of profuse diarrhœa, when the bile salts which should be returned to the liver are swept away in the stools?

Cholesterin ($C_{26}H_{44}O$).—The chief interest of this constituent of the bile lies in the fact that it forms the main constituent of the concretions known as gall stones. Very little is known as to its mode of formation; in a gall stone its presence can be detected by crushing the stone, dissolving out the cholesterin with chloroform, and adding strong sulphuric acid to the chloroform solution, when a red color is produced.

The yellow coloring matter of the bile of man and of the carnivora is due to a pigment bilirubin $C_{32}H_{36}N_4O_6$; the green coloring matter of the bile of herbivora is due to a pigment biliverdin $C_{32}H_{36}N_4O_8$. These pigments are derived from blood-coloring matter, for bilirubin is indistinguishable from hæmatoidin, a pigment found in old blood deposits. Biliverdin is a more highly oxidized state of bilirubin; either of them if reduced with nascent hydrogen yields hydrobilirubin, $C_{32}H_{36}N_4O_5$, which is identical with urobilin, the bile-pigment derivative in urine, and with stercobilin,

the bile-pigment derivative in fæces. Bile pigment differs from blood pigment in that it contains no iron; consequently, iron salts are found deposited in liver tissue. Small quantities of phosphate of iron are present in bile, but not in bile pigment.

The work of the bile is to assist in the digestion of fat, which it does by acting both as an emulsifying and a saponifying agent; the emulsification of the fat is favorable to its digestion, and the saponification is favorable to its diffusion or osmosis. Bile prepares the contents of the stomach, as they are passed into the intestine, for the digestive action of pancreatic juice; this it does by neutralizing the hydrochloric acid of the gastric contents, and so putting an end to the action of pepsin. It also promotes the digestion of starch and stimulates the peristaltic movements of the intestines. Being a weak antiseptic bile retards the putrefaction of food in the intestines; hence in cases of obstructive jaundice, in which bile is absent from the intestines, the stools are more offensive than usual to smell.

The liver is a source whence sugar is discharged into the circulation, for the portal venous blood contains only 1 part of sugar per 1,000, whereas the hepatic venous blood contains 2 parts of sugar per 1,000, and considering the great quantity of blood passing through the liver, this means that a large amount of sugar is being daily produced by the liver and discharged into the blood leaving that organ. From what is this sugar produced? It is produced from a substance named glycogen, which is manufactured by and stored up in the liver cells.

Glycogen ($C_6H_{10}O_5$) is a member of the carbohydrate group, and is an isomer of starch and dextrin. The production of sugar in the liver takes place in two stages; first, the formation of glycogen, and second, the conversion of glycogen into sugar. Glycogen is derived from food, and especially from carbohydrate foods. It is also derived from proteids, but not from fat, as the livers of animals fed exclusively on fat contain no glycogen. If minced up liver is boiled with water the glycogen is extracted, and can be precipitated by the addition of alcohol to the aqueous extract. It is a white powder soluble in water and yielding an opalescent solution. Iodine gives a mahogany brown color with glycogen; by boiling with dilute sulphuric acid glycogen readily combines with water and yields glucose.

The amount of sugar in the venous blood of muscle is below that present in the arterial blood; sugar is therefore consumed by living muscle, to which it is a food and heat producing substance. Glycogen must therefore be regarded as a temporary carbohydrate reserve, stored up for the time in the liver and capable of conversion into sugar, as demand for the latter arises within the system. On the one hand, it is formed by and deposited in the liver cells from materials brought to the liver in the portal blood; on the other hand, it is given out by the same cells in the form of sugar, as necessity arises. The glycogen of the liver is diminished by fasting, by fevers, and in cases of poisoning by arsenic and phosphorus, the diminution in the last three cases being due to derangement of function of the liver cells. The glycogenic function of the liver is intimately associated with the interesting disease known as diabetes. In this disease there is an excess of sugar in the blood, which excess is disposed of by the kidneys, and so appears in the urine. This excess of sugar in the blood may be attributed to abnormal action of the liver, *i. e.*, increased production of sugar, or to deficient consumption of sugar by the tissues. It is probable that both causes co-operate in the causation of diabetes, although the former is doubtless the more potent factor. Since the system can only dispose of a definite quantity of sugar in a certain time, if the blood contains more sugar than usual, the excess of sugar must of necessity make its appearance in the urine. It follows that it is essential in the treatment of diabetic patients to exclude from their diet all starchy and saccharine substances.

Nitrogen enters the organism in the different proteid articles of food; it leaves mainly as urea. The liver is the chief place where urea is formed, the kidneys acting as filters through which it passes in solution. As to the actual formation of urea and uric acid in the liver not much is known. We are acquainted with some intermediate substances between proteids and urea, bodies which are less complex than proteids, but which are more complex than urea; these substances are certainly derived from proteids, and are probably some of the antecedents of urea. They are, leucine and tyrosine in the intestines, glycocine in glycocholic acid and in the intestines, creatine and sarcosine in muscle, and uric and hippuric acids in urine.

It is known that the introduction of glycocine and leucine into

the bowel or into the circulation increases the amount of urea. As further evidence of the great importance of the liver as an excreting organ, I may mention that many poisons, especially metallic ones, and particularly antimony, arsenic, copper, lead and mercury are excreted by the liver.

ALLIACEOUS PLANTS AND THEIR PRODUCTS.

BY P. L. SIMMONDS, F.L.S.

The allyl compounds may be said to be chiefly products of various species of *Allium*, which are favorite food substances in many countries, and comprise among others, *A. Ceba*, the onion; *A. sativum*, garlic; *A. ascalonicum*, shallots; *A. Schænoprasum*, chives; *A. Porrum*, the leek; *A. Scorodoprasum*, rocambole.

Nearly all of these contain allyl (C_6H_5) also sulphur combined, forming sulphide of allyl. The cruciferæ, as watercress, contain likewise cyanogen in combination, forming $C_2NS_2 + C_6H_5$ (sulphocyanide of allyl), also instanced in mustard, horseradish, radishes and cabbages, causing a hot bitter taste. The bulbs of this onion family are sudorific, and the leaves of some form a good condiment. All the species agree in their stimulant, diuretic and expectorant effects, differing merely in the degree of activity. Raw onions quench excessive thirst. The bulbs of the Indian onion (*A. rubellum*, Bieberstein) are of stronger pungency than ordinary onions; those of the continent milder.

Although more industrial and economic than pharmaceutical, a few words may not be out of place as to the consumption of the plants named in different countries.

The importance of the onion will be conceded by all, being wholesome and nutritious, and especially valuable for its anti-scorbutic properties. It is largely cultivated and eaten in Great Britain to the extent of about 40,000 tons, and nearly four million bushels are also received there annually from various countries. In the United States millions of bushels are produced annually. It not only enters largely into local consumption, but is a considerable article of export to ports of South America, the shipments in 1890 having been 80,275 bushels, valued at \$77,760.

The large and mild onion forms one of the common and universal supports of life in Spain and Portugal. Analysis shows that it ranks next to peas and grain in nutritious properties, although its pungent flavor has much to do with its enjoyment. It is not merely as a relish that the wayfaring Spaniard eats his onion, with his humble crust of bread, as he sits by the refreshing spring; but it is because experience has proved, that like the cheese of the English laborer, it helps to sustain his strength also, and adds, beyond what its bulk would suggest to the amount of nourishment which his simple meal supplies. The onion and garlic are among the most important articles of food of the Greeks and other Oriental nations. The flowering stalks of the onion are made into curries and eaten by low-caste Hindus and Mohammedans; but onions are forbidden to Hindus. The Institutes of Menu prohibit the higher castes from eating the onion, garlic and leek. These three plants are, however, cultivated in India at the

present day, and the leek bears its Egyptian name "Khorat." The bulbs of *Allium Nuttalli*, Watson, are eaten by the Indians and settlers in Arizona.

The cultivation of the onion is one of the most important in Bolivia, and garlic is also common.

One of the most curious applications of alliaceous plants, is that of the bruised bulbs of garlic or onions, and *Asphodelus bulbosus*, mixed with gunpowder, to prevent the hair falling off, in Oriental countries. Garlic is eaten to a much greater extent than the onion by the natives of India, the aggregated white bulb, or cloves, being offered for sale in every bazar.

It was formerly held in great repute in medicine, but is seldom employed in England, although used in the United States. The bulbs of garlic have been used in dropsies, and as an anthelmintic. Steeped in rum they form a favorite remedy among country people for the whooping cough; the infusion is rubbed night and morning into the skin of the patient's loins. A clove of garlic, or a few drops of the juice, introduced into the ear are said to prove highly efficacious in atonic deafness.

A considerable demand has sprung up lately for garlic oil for pickles, sauces, etc. It is a clear, limpid oil, useful for flavoring in cookery, but not made to any extent. Sp. gr. 1.057. The yield is 1 kilo of oil from 1,600 kilos of bulbs.

[To be continued.]

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, April 26, 1892.

The meeting was called to order and Charles A. Heinitsh was asked to preside.

The minutes of the last meeting were read and approved.

Mr. Summers, who had consented to give at this meeting some account of his recent trip to Bermuda and the West Indies, was unavoidably absent, and the subject was postponed to the fall term.

Dr. C. B. Lowe, being too unwell to be present, sent a specimen of a hard *rubber spatula* to take the place of the clumsy horn implements that have been used in cases where metallic spatulas were undesirable. The neatness of the article met with general approval.

Prof. Maisch stated that Mr. A. B. Petrie, of Canada, in a note to him described a novel adulteration in *gum arabic*, consisting of fragments of *rock salt*. This elicited a discussion upon the present source of the gum arabic now in the market; the supply from the Kordofan district being shut off, our supply must now be obtained from points further east, nearer the Red Sea. It was stated that some of that now sold as gum arabic is gum senegal which has been exposed to a heat sufficiently high to render it full of cracks and thus give it a greater likeness to true gum arabic.

Mr. Beringer read a paper upon *commercial vanillas* and accompanied it with samples of the various kinds now found in commerce. The paper was referred to the publication committee, and the thanks of the meeting were returned to the author.

Mr. Beringer exhibited a *plant press* suitable for the use of those who go out

on botanical excursions. It is made of light strips of wood well varnished, and the pressure necessary to keep the specimens closely packed is obtained by a cord passing through small pulleys.

The following information regarding several inquiries was furnished: *Hydracetin* was described in the Am. Journal of Pharm., 1889, p. 354; in the impure state it was used at one time in England under the name of "Pyrodine." Its chemical name is *acet-phenylhydrazid* and formula $C_6H_5NH-NHC_2H_5O$. It has antipyretic action, the daily dose not to exceed 0.1 gm; it is a powerful reducing agent and has been successfully used as a 10 per cent. ointment in psoriasis.

What is the reaction in making Dobell's Solution?—The answer to this can also be found in back numbers of the Am. Journ. of Pharm., 1883, 447-456, in a paper by W. R. Dunstan. The following reactions are there given as showing the changes that take place on adding glycerin to borax: $2C_3H_5(OH)_3 + Na_2B_4O_7 = 2C_3H_5BO_3 + 3H_2O + 2NaBO_2$, according to which the glycerin abstracts boric acid from the tetra-borate, leaving meta-borate and forming glyceryl-borate (or borin); the borin, however, is decomposable by water, hence, a second reaction occurs: $C_3H_5BO_3 + 3H_2O = C_3H_5(OH)_3 + H_3BO_3$; in aqueous solutions, therefore, the glycerin present is unchanged at the close of the reaction: $2C_3H_5(OH)_3 + Na_2B_4O_7 + 3H_2O = 2C_3H_5(OH)_3 + 2NaBO_2 + 2H_3BO_3$.

The free boric acid then reacts with the sodium bicarbonate, one of the constituents of Dobell's solution (the fourth constituent, carbolic acid, does not enter the reaction) forming water, carbon dioxide and sodium meta-borate (in the presence of sufficient glycerin, otherwise sodium tetra-borate or a mixture of the two salts will be produced). The action of glycerin upon borax solution can be followed by noticing the reaction towards litmus paper; borax solutions are alkaline, but the addition of glycerin will develop an acid reaction; by the aid of heat the alkaline reaction is restored, becoming acid again, however, on cooling; diluting with water will also change an acid reaction into an alkaline one. It is also interesting to note that glycerin is not the only chemical to bring about this change; all polyatomic alcohols or aldehydes containing as many (OH) groups as carbon atoms will bring about the same reaction; thus mannite, glucose, lævulose, glycol will produce the same change, while saccharose will not effect it.

Owing to the alterations in the College building, which have been commenced, it was resolved to omit the pharmaceutical meeting in May; and there being no further business, a motion to adjourn was adopted.

T. S. WIEGAND, Registrar.

EDITORIAL.

The American Pharmaceutical Association will hold its fortieth annual meeting at the Profile House, White Mountains, N. H., commencing on Thursday forenoon, July 14, at 9 o'clock. This is a departure from the custom hitherto followed in holding the first session in the afternoon of Tuesday, or, of late years, Monday, and winding up with the last session held on Thursday or Friday following. At the next meeting it will become necessary to extend the sessions into the following week, thus affording a day of rest before the

final adjournment. The Council will have to hold a session on the evening preceding Thursday for the purpose of arranging the business that is to come before the Association.

The place of meeting is accessible from all parts of the country, tickets at summer excursion rates being sold by most railroad companies, good until October next. Arrangements have been made by the Committee for an excursion from Boston to the White Mountains, visiting, besides the Franconia Notch where the Profile House is situated, also Mount Washington, Crawford Notch and other places of interest, the fare for the round trip back to Boston being \$12.54; tickets to be secured through the Local Secretary, Mr. H. M. Whitney, Lawrence, Mass. To enable the members to join this excursion, the usual convention rates have been secured by the Committee on transportation from the different parts of the country to Boston and return; full fare to be paid to Boston, the party obtaining at the same time from the ticket agent a convention certificate, which is to be signed by the Committee, when a return ticket may be purchased at Boston at one-third fare. As a further inducement to members to join that excursion party, the druggists and pharmacists of Boston and vicinity have made preparations for extending courtesies to visitors arriving at Boston several days previous to the meeting. The Hotel Vendome has been designated as the headquarters in Boston; the rate will be \$4 per day, and accommodations there or at any other hotel will be secured by addressing the Local Secretary. The excursion will leave Boston on Wednesday, July 13, at 8.30 A. M., cross Lake Winnipisaukee, pass through the Pemigewasset Valley, and reach the Profile House early in the evening, where a special rate of \$3 per day has been secured.

The meeting promises to be well attended from the different sections of North America; and since the invitation, extended by the Association, for holding the Seventh International Pharmaceutical Congress next year in Chicago has been well received abroad, it will be of considerable importance that at the forthcoming meeting proper steps be taken towards making the contemplated international meeting as successful as possible.

Amendment to the Pennsylvania Pharmacy Law.—It is well known that through the influence of some members of a former legislature, who were graduates in medicine, the Pennsylvania pharmacy law was burdened with a section known as section 11, permitting—if not directing—the registration of medical practitioners as apothecaries; and that an effort made to have this section repealed, failed to receive the legislative approval through similar influences. During the past month when the Medical Society of the State of Pennsylvania held its annual meeting at Harrisburg, Dr. Roebuck, of Lititz, presented resolutions, expressing the sense of the Medical Society in favor of the repeal of the above clause, as follows:

WHEREAS, It is the desire of the Pennsylvania Pharmaceutical Association to offer an amendment repealing section 11 of the pharmacy law, which permits physicians to carry on the retail drug business without examination in practical pharmacy; therefore, be it

Resolved, That it is the sense of the Medical Society of the State of Pennsylvania that no physician should be permitted to carry on the retail drug business without proper qualifications, as determined by an examination in practical pharmacy.

Resolved further, That it is also the sense of this society that the Pennsylvania Pharmaceutical Association should use its best efforts in securing action prohibiting druggists who are not registered physicians from prescribing for diseases.

As might have been expected, some of the physicians present spoke in opposition to the resolutions, and from the remarks made by a few of them, it would seem that they believed themselves at least equally, if not better, versed in all the details of pharmacy than those who had spent a lifetime in its practice. On the other hand, a number of influential physicians showed that medical education did not embrace the details of pharmacy, and that, as a rule, physicians were not able to carry out the necessary pharmaceutical manipulations, and were not prepared to properly attend to the other numerous duties of the pharmacist. The resolutions were adopted by a vote of 61 in favor against 19 in opposition. Since the question before the meeting appeared not to have been properly understood by all, a second vote was taken, resulting in 66 ayes to 23 nays.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Handwörterbuch der Pharmacie. Praktisches Handbuch für Apotheker, Aerzte, Medicinalbeamte und Drogisten. Herausgegeben von A. Brestowski, Herausgeber und Redacteur der "Pharmaceutischen Presse." Wien and Leipzig. Wilhelm Braumüller. 1892.

Dictionary of Pharmacy. A practical handbook for apothecaries, physicians, medical officers and druggists.

This work is published in parts, each of 80 quarto pages, at 2.40 marks (German) each, and will be completed in about twenty parts, forming two volumes. The text is printed in double columns, the subjects arranged in alphabetical order and indicated by broad-faced type; the typographical work is clear, and the paper good and serviceable—qualities which are of importance to a work intended for frequent consultation. The two parts, or 160 pages, before us bring the text to "aseptol." On perusing these pages a good insight is gained of the scope of this dictionary, which covers the field of pharmacy quite thoroughly. Strictly medical terms have been admitted only as far as they are likely to be met with in the practice of pharmacy, and are either simply translated into German, like "Acholik = Gallenmangel," *i. e.*, absence of bile; or a brief explanation is given, as for "abscess" and "acupunctur;" or besides the simple explanation other particulars are given relating to chemical characters or analysis, as for "Acetonurie," where methods for detecting the presence of acetone in urine are also described. As a matter of course, all strictly pharmaceutical terms have received their due attention, as well as the medicinal plants, animals, minerals and chemicals, and those botanical, zoölogical, mineralogical and chemical terms which are, or may be used in pharmacy. It is in this latter respect more particularly very difficult to draw a sharp line between such that properly belong to pharmacy, and such that are not pharmaceutical; the more so, since in recent years the search for new remedies, or perhaps more correctly, for novelties, has attracted ephemeral attention to a large number of crude drugs and artificial products, alongside of which many of the older claimants for recognition as remedies make their appearance from time

to time. In view of these facts it was obviously advisable to take cognizance of all such matters, and include also descriptive terms, as well as such relating to the classification of the remedial substances. It is for these reasons that this pharmaceutical dictionary is also—within the limits indicated—a dictionary of the sciences accessory to pharmacy. Reference has already been made to the fact that the different items are treated very briefly or more fully, in proportion to their importance in pharmacy, and in looking over the long list of names and terms presented, there are very few, if any, for which either greater brevity or more extended notices would be deemed preferable for a work of lexical character. In this connection we venture to make the suggestion that in explaining the abbreviations of authors' names as met with in botanical descriptions, it would be a very welcome information for many, if in a brief manner it was indicated whether the botanist was still living or deceased, in the latter case by simply stating the year in which he died. Necessarily the information given must be brief; but even the outlines of processes, reactions, uses, etc., are very clearly stated, and corrections are scarcely ever needed, as for instance, for *Acalypha indica*, which is said to be a North American plant, but is in reality indigenous to India. To expedite the work and, comprehensive as it is, to render it as nearly accurate as possible, the labor is performed by some forty or more contributors. Inconsistencies, which are almost unavoidable under such circumstances, have been very rarely observed by us. A case in point is furnished by the article on Alkaloids (p. 48), which are described to be organic bases, and to have not been observed (among others) in the order of Compositæ; yet *argyræscin*, a glucoside, is defined (p. 137) as an alkaloid, and *Anthemis arvensis* is stated (p. 107) to contain an alkaloid.

In summing up our view concerning this work, it affords us great pleasure to state that we can heartily recommend it, as one of great utility and exactness, and at the same time of such a comprehensive scope that scarcely a term applicable to pharmacy will be missed from it.

The Pharmacal Calendar for 1892; being an exhibit of pharmacy in the United States as related to Colleges, Associations and Pharmacy Laws, together with synopses of drugs with their strengths, doses and synonyms. By C. S. Hallberg. Chicago. Price, \$1.

This is a very handy work and very useful to all those who take an interest in pharmaceutical matters. The title page gives to some extent an idea of its contents, but it cannot indicate the convenient arrangement, nor the great labor that was necessary for the compilation of the numerous facts and dates. That some errors have crept in, is not to be wondered at; but they are few and do not detract from the general accuracy of the statements, and will doubtless be corrected in the next edition. Among the German names, given with a list of synonyms of domestic remedies, are many which are locally used only, or which are provincial corruptions of the proper German names. It should be stated yet that the information concerning associations is not confined to pharmaceutical associations and examining boards, but extends also to medical associations, and to the American chemical, microscopical and science associations; and lists of medical and veterinary colleges are likewise given. In the pharmacal calendar proper, which extends from March 1, 1892, to February 28, 1893, the dates of birth and death of many prominent

pharmacists, American and foreign, and of other notable persons, are indicated.

Formulaire des médicaments nouveaux et des médications nouvelles pour 1892, par H. BOCQUILLON-LIMOUSIN, pharmacien de 1^{re} classe, avec une introduction par H. HUCHARD, médecin de l'hôpital Bichat. Paris: J. B. Baillière et Fils. 1 vol. in-18 de 322 pages. Price, 3 francs.

Formulary of new medicaments and novel medications.

This formulary is intended as a supplement to the official pharmacopœias, and more particularly to the French Codex. To American pharmacists it is of especial interest on account of the large number of drugs of North American origin noticed, which have been in use on this side of the Atlantic for a long time, and because others of foreign origin have been recognized by our pharmacopœia for some time and are enumerated as comparatively new drugs in France. Among the latter may be mentioned cerium oxalate, amyl nitrite, kamala, bebeeru bark, pareira brava and rumex crispus; from the much longer list of the former class we mention only *Aletris farinosa*, *Ambrosia artemisiæ-folia*, *Apocynum cannabinum*, *Asclepias tuberosa*, *Baptisia tinctoria*, *Cimicifuga racemosa*, *Cornus florida*, *Euonymus atropurpureus*, *Grindelia robusta*, *Hamamelis virginiana*, *Hydrangea arborescens*, *Hydrastis canadensis*, *Leptandra virginica*, *Liatris odoratissima*, *Podophyllum peltatum*, *Rhamnus Purshiana*, *Rhus aromatica*, *Sabbatia angularis*, *Sanguinaria canadensis*, *Scutellaria lateriflora*, *Spigelia marilandica*, *Stillingia sylvatica* and *Viburnum prunifolium*. Among the more than 500 articles are necessarily included, besides drugs of African, Asiatic and South American origin, also the numerous synthetical remedies introduced during the past ten years, various alkaloids, albuminoids, salts, camphors, mixtures like ichthyol and thiol, and forms of medication like antiseptis, gauzes, etc. In each case the origin or mode of preparation is given, together with brief characteristics, physiological and therapeutical properties, the mode of administration, doses, incompatibles, etc. In order to compress all this information into the limited space, conciseness was absolutely demanded; but the facts that are of practical value to the pharmacist and physician are, as a rule, stated clearly and with sufficient detail for application. Among the articles, and following chrysarobin, is mentioned chrysophanic acid, as being recommended internally and externally in skin diseases, and as having been employed hypodermically by Dr. Stocquart; it is, probably, the former product, which, for a time, was employed under the latter name, until its true composition was made known. Cicutine bromhydrate in this list is the conine salt. While a number of formulas for the administration or application of some of these remedial agents have been admitted, it is *not* the object of this work to give copies of prescriptions, but rather all the important information necessary to enable the physician to intelligently prescribe, and the pharmacist to identify and dispense these remedies. That in these respects this book will be quite useful may readily be gleaned from the above description.

The Species of Rumex occurring north of Mexico. By William Trelease.

A very valuable monograph, revising the species of *Rumex* indigenous and spontaneous in North America, and accompanied by 21 well executed plates. It is a reprint from the third annual report of the Missouri Botanical Garden.

OBITUARY.

Sereno Watson, one of our best known American botanists, died March 9, last. He was born at East Windsor Hill, Conn., December 1, 1826, graduated from Yale College in 1847, taught school for several years, then graduated in medicine from the University of New York, and subsequently devoted his time to the study of botany. His report on the "Botany of the 40th parallel," which appeared in 1871 as part of the report of the geological survey by Clarence King, established his reputation as a botanist. In the same year he became Asa Gray's assistant at Cambridge. The polypetalæ of the Flora of California, the first volume of which made its appearance in 1876, were elaborated by the joint labor of Professor Brewer and Dr. Watson; and the entire second volume, published in 1880, was his sole work. Another fruit ripened through these labors was the "Bibliographical Index" of the North American polypetalæ, published in 1878. After the death of Asa Gray, in 1888, he was made Curator of the Gray Herbarium and Library, and together with Professor John F. Coulter, of Wabash College, was selected for the revision of the "Manual of the Botany of the Northern United States," which was published two years ago. His "Contributions to American Botany," published in the Proceedings of the American Academy, embrace the revision of several orders and of quite a number of genera belonging to other orders of plants growing in the United States and in Mexico.

August Wilhelm von Hofmann, the celebrated chemist, died suddenly at Berlin, May 5, of pulmonary apoplexy. The deceased was born at Giessen, April 8, 1818, and entered the university in his native city in 1836, at first for the study of law, but afterward studied chemistry, and graduated in 1841, his inaugural dissertation being on the organic bases of coal tar, in which, among others, he proved the identity of Runge's cyanol with aniline. He remained at the same university as Liebig's assistant until 1845, when he became lecturer on agricultural chemistry at the University of Bonn, and in 1848 accepted a call to the Royal College of Chemistry in London. In 1853 he succeeded Playfair in the chair of chemistry to the Royal School of Mines, became assayer of the mint in 1856, was elected President of the Chemical Society in 1861, accepted the chair of chemistry in Bonn, in 1862, and removed to Berlin, in 1867, becoming the successor of Mitscherlich, and in 1868 the founder of the German Chemical Society, and continuing in his professorship to the time of his death. Of the greatest importance for theoretical chemistry were his researches on the relation of the alkaloids to ammonia, which led to the discovery of fuchsine in 1858 and opened up an almost unlimited field in chemical research, and in the application of its results in the arts. It is impossible in this limited space to even refer to all of his important researches in organic, inorganic, analytical and applied chemistry, which were published in the "Annalen," the "Proceedings of the Royal Society," and the "Berichte der Deutschen Chemischen Gesellschaft." Among the separate works from his pen may be mentioned his "Handbook of Organic Analysis" (1853), "Introduction to Modern Chemistry" (1865; the edition in German appeared in 1868). "The Lifework of Liebig in Experimental and Philosophical Chemistry" (1876), and in the German language reports on chemical exhibits at international expositions; necrologies of scientists; correspondence between Liebig and Woehler; the relation of organic chemistry to medicine; alche-

mists of Berlin, etc. During the recesses in his professional labors, Prof. Hofmann visited most of the European countries, Western Asia, Northern Africa, and in 1883 also North America. For some of his labors prize medals were awarded to him in 1841, by the Paris Society of Pharmacy; in 1854 the Copley medal; in 1875, the Faraday medal; by the French Academy of Sciences, in 1864, the Jecker prize; in the same year the industrial gold medal of Mulhouse; and in 1867 the grand prize of the Paris Exposition. The honorary degree of LL.D. was conferred upon him by the University of Cambridge, and that of M.D. by the University of Bonn. He was elected an honorary member of many learned societies; among the pharmaceutical societies those of Great Britain and Paris, also the Philadelphia College of Pharmacy, had enrolled his name among their honorary members.

William F. Simes died suddenly of apoplexy, May 21, in the 74th year of his age. The deceased belonged to a Philadelphia family, well-known as druggists and apothecaries, and learned the business with his father at Twenty-second and Market Streets. In 1864 he was in business on Third above Arch Street, but soon after removed to 1102 Market Street, where he continued until the buildings on that square were taken down to be replaced by the present large warehouses; his last location was on Thirteenth below Market Street. For about twenty years he was much interested in camphor and the refining of it, and introduced into use "compressed" camphor, made by subliming camphor, condensing it as a fine powder, and compressing this into hard cakes by hydraulic-pressure; the works for carrying on this industry were finally removed to the lower part of the city near the Pennsylvania salt works. The body of the deceased was reduced to ashes at the Philadelphia Crematorium on Washington Lane. From a newspaper account, we clip the following:

"The residue of his estate is valued at about \$200,000, and is bequeathed to the widow of the deceased and his children. The instrument also bequeathed \$5,000 to the Pennsylvania Hospital to establish a free bed and \$5,000 to the College of Pharmacy. Provision in the will is also made for the establishment of an annual prize of \$50 to be given to a graduate of the College of Pharmacy who shall prepare the best essay on "Camphor." Directions are left to the executor to present to each of these institutions a portrait of the deceased."

We understand that the last will of the deceased has not yet been probated and no official notification of the legacy has as yet reached the College.

Notice of the death of the following graduates of the Philadelphia College of Pharmacy has been received:

Claude H. Arnold, class 1886, died April 7, last, near Gladstone, Cal., of lung hemorrhage, aged 26½ years. He was born in Gorham, N. Y., after graduation remained in Philadelphia, until by failing health he was compelled to join his parents at Clifton Springs, N. Y., and in 1890 removed to Pasadena, Cal., subsequently to the ranch where he died.

Moritz Kalteyer, class 1886, was found dead upon his father's grave, at San Antonio, Tex., April 30, death having been caused by neuralgia of the brain, from which he had been suffering for some time. He was born in San Antonio, had recently gone into partnership with his cousin, William Kalteyer, was not married, and at the time of his death was in his 27th year. An abstract of his thesis on *Sophora speciosa* was published in the October number of this Journal, 1886.

THE AMERICAN JOURNAL OF PHARMACY.

JULY, 1892.

THE ASSAY OF ALKALOIDAL PREPARATIONS EXEMPLIFIED BY THAT OF FLUID EXTRACT OF NUX VOMICA.

BY J. U. LLOYD.

The original feature of the method of assay described in the following paper is similar to that offered for Fluid Extract of Guarana.¹ The results obtained are such as will probably occur with any person who will exercise ordinary care, although, from the nature of the case (as will be seen) some variation in results should be expected. The details of manipulation are given rather more in detail than is usually necessary, but these will please some persons who are interested in this work, although naturally unnecessary with others. One series of rotations is saved, it is seen, by this modified method as compared with the general scheme announced a year ago.² The use of the "iron magma" prevents subsequent emulsions, and carries the alkaloid quickly into a neutral solvent, and this is the characteristic feature of the general scheme. From this solvent its abstraction is but a matter of routine work, and such variations in returns as occur with the process depend upon this subsequent part of the manipulation, for all of the alkaloid is abstracted from the "iron magma."

It may not be out of place to repeat that assaying to total

¹ See American Druggist, May 15, 1892, p. 146, where a description of the mechanical mixer and form of graduate most suitable for the use of the latter will be found.

² To Prof. Simon the plan of this method was described in New Orleans during the meeting of the A. P. A., and it would have been published sooner but for experiments of Prof. Norton that I did not wish to forestall.

alkaloids cannot prevent alkaloidal substitution. I take it for granted that this is not a problem with manufacturers, for they all desire to produce uniform products; none can afford to sanction intentional sophistication, but, upon the contrary, all aim to preserve their commercial standing and uphold the integrity of the profession. The variation in the commercial specimens that have come under my observation is certainly not the result of intentional mismanagement, and I have met with no evidence of cheaper alkaloids having been substituted for those less expensive.

Prof. Hallberg, at the Indianapolis meeting of the Indiana Pharmaceutical Association, stated, quite correctly, that an assay of *Nux Vomica*, to be complete, should give the relative proportion of each alkaloid. To this all will agree, but, at present, it seems that all we can hope to accomplish will have been obtained if a standard for the mixed natural alkaloids be established. In this the proportion will not, as a rule, vary greatly from equal amounts of strychnine and brucine. In this connection, I can say that one specimen of fluid extract in the following list was valued by the manufacturer, to (1) extractive matter, (2) mixed natural alkaloids, (3) strychnine, and (4) brucine; thus showing that to one maker, at least, it would not be burdensome now to attempt closer valuation.

Prof. Norton remarked, concerning the general method announced by me a year ago, as investigated by himself, that "it is probable that more extended experiment will lead to modifications restricting still further the range of variation, as well as extending the range of application." It remains to be seen if this paper furthers the prediction in any way other than supporting the fact stated in his paper, that, regardless of the method employed, increase in weight may be expected with chloroformic residues of brucine.

In the preceding paper on this subject (see *Am. Druggist*, May 15), tests concerning the absolute abstraction of the magmas from fluid extract of guarana were neglected. Caffeine being so nearly tasteless in small amounts and so indifferent to alkaloidal reagents will not respond to tests with the readiness of most other alkaloids and is difficult to establish exactly, when in minute amounts. Perhaps the best method is to crystallize and weigh it, which is impractical with traces.

I have noticed in attempts that are made occasionally to compare different assay methods, that the opinion seems to prevail that the

highest result should be taken as the standard. This I believe is not always warranted. We have as yet much to learn concerning the amount of true crystallizable or active alkaloids in some of these crude amorphous residues. Where the work is checked by testing of residues to show complete abstraction of alkaloid, for alkaloids that *do not wear out in manipulation*, the *lowest* result would probably indicate the nearest true average.

The method of assay suggested herein need not, in its application, require the personal attention of an expert chemist, the chief chance for variation being in the drying and weighing of the final residue, which is not confined to this method, but occurs alike with all gravimetric schemes. Many of the evaporations of the following experiments were made in deep platinum dishes and these were most satisfactory, although unnecessary for approximate valuations.

Notwithstanding such experimental variations, which exist even with absolutely pure alkaloids, the gravimetric method seems preferable to the volumetric by reason of the difficulty of establishing the end reaction with alkaloidal reagents. One of the pressing desideratums of this day is that of a delicate alkaloidal color indicator.

Process.—The process may be divided into sections, as follows:

TO ASSAY FLUID EXTRACT OF NUX VOMICA.¹

(1) Into the graduate pour 5 cc. Fluid Extract of *Nux Vomica* and 10 cc. of Chloroform, then add 8 grams of Iron Mixture,² stir together, and add Glucose Mixture³ (from 2 to 4 cc.) enough to form a pulp.

Stir briskly and decant the chloroform into a beaker glass, then successively wash the magma with two portions of chloroform, each 10 cc., decanting each into the beaker. Should the magma adhere to the sides of the graduate above the stirrer, scrape it down occasionally by means of the spatula side of the stirrer.

Evaporate the chloroform, pour upon the residue 6 cc. dilute (1 to 49 by measure) sulphuric acid, warm gently and filter through a

¹ This process without the mechanical mixer was the one I suggested to Prof. Norton, and which was employed in the University of Cincinnati determinations. (See Journ. Anal. and Applied Chemistry, March, 1892.)

² Equal amounts of dry ferric hydrate and sodium bicarbonate, mixed.

³ Equal measures of glucose and water.

small paper into a 4 or 8-ounce globular separating funnel.¹ Wash the residue in the beaker twice, with diluted acid 4 cc. each time, stirring the undissolved fat with the acid by means of a glass rod, and filter through the afore-named filter into the first acid solution and then wash the paper with a little water.

(2) Make the mixed acid liquids alkaline with ammonia and add 10 cc. chloroform; rotate (not shake) a moment, then abstract the underlying chloroform into a tared evaporator. Repeat the washing with two successive portions each of 10 cc. chloroform, abstracting them into the vessel with the first portion. Evaporate the chloroform, bring the residue to constant weight in a drying room, and multiply its weight expressed in grams, by 20. The result will be the alkaloidal percentage of the fluid extract.

Remarks.—This alkaloidal residue consists practically of about equal amounts Brucine and Strychnine.²

In making a series of comparative tests, the final glasses should be kept together in the desiccator and the weighings should be made at one time in order that similar conditions may be maintained. In damp weather care must be observed to weigh quickly or the operator will be led into error by reason of the hygroscopic nature of the glass and residue.

EXPERIMENTS WITH ALKALOIDS OF NUX VOMICA.

(1) *Abstraction of Brucine from Chloroform.*—That some alkaloïds fail to return to original weights when evaporated from chloroformic solution has been shown by Prof. Norton and Mr. Nichols, and occurred to the writer in previous experiences, and among them brucine is conspicuous.³ To Prof. Norton and Mr. Nichols, however, is due the credit of calling public attention to the remarkably increased weight in brucine, when deposited from chloroform, their report being summarized as follows:⁴

¹ Upon application to the author, a pamphlet will be mailed concerning these manipulations.

² Owing to the increase in weight of brucine after solution in chloroform, the result is a trifle high as compared with dry brucine, but about right considering the commercial crystals.

³ See also my pamphlet contributed to the Cincinnati Chemical Society, April 15, 1892, printed September 1, 1891, which will be mailed on application.

⁴ *Journ. Anal. and App. Chem.*, March, 1892, p. 172.

Average of 0.1 gm., five experiments, increase, 8.9 per cent.

" 0.05 " " " 8.4 "
" 0.01 " " " 5.5 "

As bearing on, and supplementary to, their experience, the following results are taken from my own recent work, these being similar to others I have experienced formerly that it is not necessary to give:

TABLE I.—EXPOSURE OF RESIDUE.

	Amount used.	1 Hour.	2 Hours.	5* Hours.	12 Hours.	100 Hours.	
	gm.	gm.	gm.	gm.	gm.	gm.	
A	0.020	0.023	0.0225	0.022	0.022	—	} One make of brucine.
B	0.050	0.056	0.055	0.0535	0.054	—	
C*	0.100	1.065	0.105	0.105	1.105	—	
D	0.020	—	0.025	0.0215	0.0215	0.021	} Another make of brucine.
E	0.050	—	0.056	0.054	0.054	0.0505	
F	0.100	—	0.115	0.116	0.105	0.1005	

* Intermission over-night in which the dry room cooled ten hours before next exposure during which the residue often increased materially and did not fully recover.

These statements show that material increase in the weight of brucine follows its solution in chloroform, and while the writer's figures add nothing else to Prof. Norton's paper, they demonstrate that this phenomenon has been observed independently and is not confined to one make of brucine.¹

For our present purpose it is important to know that by the gravimetric method, in consequence of the increase of brucine, the apparent yield of mixed alkaloids of *nux vomica* will be higher than the real, unless lengthy (impractical) exposure of the residue to high temperature be made, in order to bring the alkaloidal residue to constant weight. The fact that this increase in weight is not uniform, and also that the temperature employed during the evaporation, as well as contact or contacts, of brucine and chloroform and duration of the exposure of the residue, influences this result, is sufficient to convince most persons that different operators should not be disturbed if they do not exactly agree in final results.

¹ Prof. Norton has determined to continue the study of this interesting and important subject, and a thorough inquiry will be made in this direction, and connected relationships chemically (if any exist) will be established.

Indeed, exact concordance of returns may be viewed, at present, with suspicion.

Brucine separates (mostly) amorphous from chloroform, and, if it be mixed with equal amounts of strychnine, overcomes the crystalline nature of that alkaloid. Hence, the crude alkaloidal residue from fluid extract of *nux vomica* is amorphous.

2. *Is Brucine completely extracted from the Iron Magma?*—Each of the residues, A, B and C, of the previous experiment (Table I) were dissolved separately in 5 cc. of a mixture of alcohol 8, water 1 (official menstuum for making Fluid Extract of *Nux Vomica*), and abstracted by the foregoing method for assaying Fluid Extract of *Nux Vomica*. The chloroform was evaporated without boiling, in the drying room, and the residue exposed to the temperature of 140° F. for two hours.

TABLE II.—RESULTS.

	Amount Used.	Amount Obtained.
A,	0.020 gm.	0.021 gm.
B,	0.050 "	0.055 "
C,	0.100 "	0.120 "

Neither the dried residual iron magma nor its solution in diluted sulphuric acid gave any taste of bitterness, nor alkaloidal reaction. There seems no reason to doubt that the brucine to the limit of perception is abstracted, leaving the iron residue clean alkaloidally.

(3) *Strychnine from Chloroform*.—Strychnine crystallizes when left by evaporation from chloroformic solution, and as the final chloroform disappears, unless precautions are taken to avoid the disturbance, more or less of the strychnine may be lost by minute crystals springing from the dish.¹ This fact, I now hold, largely accounts for discrepancies with strychnine recoveries that seem to have been misinterpreted by others as well as myself, for I can see no other explanation for loss of alkaloid.²

Prof. Norton said of it, "Strychnine exhibits great variation, with

¹ See note Am. Druggist, May 15, p. 151. The same is true of caffeine. These substances will often spring several inches in height and in considerable quantities.

² Prof. Norton and Mr. Nichols (Jour. Anal. and App. Chem., March, 1892, p. 172), from an average of ten experiments lost 0.7 per cent. of the strychnine, by evaporation in ordinary dishes, but the individual results were very discordant.

tendency to loss." I may add that with proper precautions, in the natural combination with brucine, this "tendency to loss" is mostly, if not entirely, overcome, for brucine renders it amorphous and prevents it from crystallizing and springing from the dish. This loss may also be prevented largely by using tall beaker glasses or flasks for evaporators, but even then, if rapid boiling is permitted, the top of the vessel may with advantage be covered with a fine wire gauze, tared previously with the vessel and weighed with it afterward. The following experiments indicate the varying results without such precautions:

TABLE III.

0.020 gm. of strychnine from chloroformic solution lost by boiling to dryness in an open beaker glass (3 inches deep, 2½ inches wide,) 0.002 gm.

0.522 gm.,	lost	0.066 gm.
0.100 "	"	0.0055 "
0.100 "	"	0.015 "

When the beakers were covered with fine wire gauze (No. 60 steel, nickel-plated), under like conditions, no loss was experienced.

By spontaneous evaporation in deep platinum dishes and final dry room exposure no loss occurred.¹

Other experiments coincided with the foregoing, and it may be accepted that in assay work, with precautions to avoid such disturbances, the loss of strychnine is not enough to overcome the gain in brucine.

(4) *Is Strychnine completely abstracted from the Iron Magma?*—By abstracting known amounts of strychnine, according to the usual process, from the officinal menstruum for making the fluid extract, it was found, as with brucine, that the magma was completely depleted of alkaloid. Neither the sense of taste nor testing the depleted magma chemically could detect it; rapidly evaporating the chloroformic solutions therefrom, however, when no alkaloid remained in the magma, resulted in variable returns, the loss ranging from 0.001 to 0.015 gm. to each portion of chloroformic solution of strychnine (0.100 gm.) operated upon, which, however, was not greater than resulted from the rapid evaporation of chloroformic solutions of known amounts of strychnine (see Table III) In both

¹ The objection to spontaneous evaporation is from the time required.

cases the loss was mechanical and mostly avoided by employing flasks, or deep platinum dishes and gauze covers, or spontaneous evaporation.

It was shown experimentally before the Cincinnati section of the Am. Chem. Society at the meeting of May 19, that the iron magma after its abstraction gave no alkaloidal reaction and was not bitter to the taste, the chloroform solutions yielding (evaporation by boiling) 98.44 per cent. of the strychnine used. There seems to be no reason to doubt, even if the chloroformic residue does not give the calculated amount of strychnine, that the magma may have been thoroughly abstracted.

(5) *Mixtures of Brucine and Strychnine*.—Brucine acts favorably when associated with strychnine, from a gravimetric view, as previously stated, for it keeps that alkaloid in an amorphous condition and thus prevents a loss that is otherwise difficult to entirely overcome.

One gm. each was dissolved in 100 cc. of the officinal menstruum for making fluid extract of *nux vomica*, and known amounts abstracted by the usual process.

TABLE IV.

	Gave	Calculated.
5 cc.,	0.107 gm.	0.100
2.5 cc.,	0.056 "	0.050
1 cc.,	0.022 "	0.020

Subsequent investigations demonstrated the complete abstraction of each magma. It was neither bitter nor capable of yielding alkaloidal reactions. In this connection, the following statement of Norton and Nichols is in order:

"A further test of the delicacy of the process was shown by the following experiment:

0.00001 gm. of a mixture of brucine and strychnine was put through the assay and the residue on the watch-glass, though not visible, still yielded the bitter taste of the alkaloids."¹

Summary.—The foregoing experiments seem to show that there is no loss in weight of alkaloid in this part of the assay method, but, upon the contrary, an appreciable increase in weight over that of the true mixed alkaloids really present. The iron magma is completely abstracted. Unless there is a loss in the subsequent rotations, the method of assay should, therefore, give slightly exagger-

¹ Jour. Anal. and App. Chem., March, p. 165.

ated results, providing that natural alkaloids yield as readily to the treatment as those just considered.

PART THIRD.

(6) *Abstraction by Chloroformic Rotations*.—There is no question but Prof. Norton has demonstrated that two rotations with 10 cc. each of chloroform practically abstract the mixed alkaloid from the acid solution obtained by the iron magma of the assay process. As may be anticipated, this, if accomplished, should result in an apparent increase in weight of the residue (see Brucine) and, hence this assay method is in favor of rather than against the preparation examined. To a fluid extract that gave an average of 1.44 per cent. alkaloid, Norton and Nichols added a known amount of brucine and strychnine, and by chloroform rotations obtained 1.99 per cent. where there should have been but 1.94 per cent.¹ This increase occurred in complete assay, beginning with the iron magma. An average of 20 rotations with brucine gave a gain of 12 per cent. An average of 20 rotations with strychnine gave a loss of 9.4 per cent.; the comparative result being a gain of 2.8 per cent. It may be accepted confidently, as has been established I think, that the weight obtained by the *first* rotation will not be less than that of the alkaloid present, and, also, that we need not draw upon the irrational theory that sulphate of ammonia has been dissolved by chloroform, to account for an increase in weight over the dry alkaloid known to be present in test experiments. It seems scarcely necessary to present further evidence in this direction, but, the following figures may be considered supplementary to the work of the gentlemen alluded to.

A solution was made of 0.050 gm. each, strychnine and brucine, in 5 cc. of a mixture of alcohol 8 parts, water 1 part. Of this, three portions of 5 cc. each were evaporated in platinum dishes by exposure in a drying room to a temperature of 170° F.:

TABLE V.

	One Hour Exposure.	Three Hours Exposure.
A,	0.104 gm.	0.1035
B,	0.105 "	0.1045
C,	0.105 "	0.104
Average,	0.1046	0.104

¹ Pharmaceutische Rundschau, May; Am. Druggist, May 15, and Journ. Anal. and App. Chem., March, 1892.

Calculated amount 0.100 gm., showing an increase from this hydro-alcoholic solution of 4 per cent.

The residues were dissolved in chloroform and again evaporated.

TABLE VI.—RESULT.

One Hour. 0.1170	One Hour. 0.116	One Hour. 0.119
Three Hours. 0.1135	Three Hours. 0.111	Three Hours. 0.110

These residues were then dissolved in chloroform and allowed to slowly evaporate spontaneously in a cold glass case for 48 hours, then heated at 170° F.:

TABLE VII.—RESULT.

One Hour. 0.1120	One Hour. 0.111	One Hour. 0.111
Three Hours. 0.1120	Three Hours. 0.111	Three Hours. 0.110

Average of twelve experiments, 0.1128.

It was, therefore, shown that, while 5 cc. of this solution gave by direct evaporation, not less than 0.104 gm. by evaporation from hydro-alcoholic solution, that the average of twelve experiments with chloroformic solution (Nos. vi and vii) was 0.1128 gm. Hence, by chloroformic rotation the total residue should range between the minimum 0.110 gm. and the maximum 0.119 gm., the average being 0.1128 gm.

To arrive at the facts, three experiments, 5 cc. each, were made of the afore-named solution (No. v). The alcoholic solution was evaporated to dryness in a platinum dish and the residue dissolved in small portions of diluted sulphuric acid (1 to 49) and poured into the rotator, then it was made alkaline with ammonia and abstracted by successive portions of chloroform, 10 cc. each :

TABLE VIII.

First rotation, 10 cc. of chloroform,	0.102
Second " " "	0.012
	<hr/>
	0.114
First rotation, 10 cc. of chloroform,	0.1075
Second " " "	0.007
	<hr/>
	0.1145

First rotation, 10 cc. of chloroform,	0'107
Second " " " 	0'005
	<hr/>
	0'112
First rotation, 10 cc. of chloroform,	0'106
Second " " " 	0'0045
	<hr/>
	0'1105
Average of 4 experiments,	0'1128 gm.
" calculated from 12 direct residues (Tables VIII	
and IX),	0'1128 gm.

The aqueous liquid from each experiment was acidulated with H_2SO_4 . It was neither bitter to the taste nor capable of reacting with Mayer's solution, showing that it had been completely abstracted and that further rotations were unnecessary.¹

These alkaloidal residues were perfectly soluble in both chloroform and diluted sulphuric acid, and could have contained but traces of impurity.

Summary.—The result of these experiments demonstrates:

- (1) That chloroform rotations will completely abstract strychnine and brucine from alkaline aqueous solution.
- (2) That the first rotation of 10 cc. yields a residue heavier than the original total dry alkaloid.
- (3) That a third rotation is unnecessary, for the alkaloid is all abstracted by two treatments.²

PART FOURTH.

STANDARD OF ALKALOIDAL VALUE FOR FLUID EXTRACT OF NUX VOMICA.

(7) *Will this Method abstract all the Natural Alkaloid from Fluid Extract of Nux Vomica?*—While it is true that chloroform

¹ At the New Orleans meeting of the A. P. A., Prof. Patch alluded to the fact that the chloroform adhering to the exit of a separating funnel accounted for much of the loss in some cases. This I have verified more than once. In fact, the larger share of an alkaloid is usually abstracted in the first chloroform, if it be drawn close to the water line.

² These averages are higher than those of Prof. Norton and Mr. Nichols, who, however, evaporated their solutions rapidly in shallow dishes. My recoveries were made in platinum dishes, by drying room exposure, without ebullition. I hold myself entirely responsible for their variations, as they were obtained according to my former process, in which I commended shallow dishes. I alone am to blame.

abstracts all of the "added" alkaloids from the magma, a question may arise as to whether natural alkaloidal compounds are also totally disintegrated. Artificial solutions of alkaloids and of alkaloidal salts may behave quite differently from those of natural combination, and, if the ferric magma does not completely decompose the natural alkaloidal compound it is probable that the chloroform will fail to abstract the alkaloid from the amount unaffected.

With a view to satisfy those to whom such a question may occur, as it did long since to the writer, the following experiments are introduced.

A young lady operator made an abstraction of the iron magma, without unusual precautions, of 5 cc. each of thirteen fluid extracts. The ferric magma from each was separately exposed to a temperature of 140° F., with occasional stirring, until all the adhering chloroform had evaporated. It was not bitter. Then it was digested with excess of diluted sulphuric acid and filtered. The clear filtrate was not bitter in any instance.¹ This sense of taste with these intensely bitter alkaloids some will consider the most conclusive evidence of the absolute abstraction of the strychnine and brucine. However, each filtrate was subsequently tested for alkaloid with Mayer's reagent, but without reaction. In order to find if it were possible for the sulphates of iron and sodium present to obscure the action with Mayer's test solution, minute amounts of solution of strychnine and brucine (one minim of a solution of 0.010 gm. each, in 5 cc.) were added to the acid solution in a test tube, when the characteristic cloudiness instantly appeared. The iron and soda magma had thoroughly dissociated the natural alkaloidal compound and the abstraction of the alkaloid therefrom was so complete that neither the sense of taste nor Mayer's test were able to detect traces of alkaloid in either the magma or a solution of it.²

(8) *Commercial Fluid Extracts of Nux Vomica*.—Thirteen specimens of fluid extract of *nux vomica* were procured in the drug

¹ One part of strychnine in 500,000 parts of solution is bitter. (U. S. D.) Brucine is more bitter than strychnine. (Lyons.)

² The use of this iron magma is the principal innovation known as my method of assay. It is but one step in alkaloidal determinations, however, the subsequent manipulations having long been well established.

market, in original vials, and severally assayed, according to the formula given on p. 339.

Every precaution was taken to preserve uniform conditions. The analyses were made successively by the author, without interruption, the exposures and evaporations were under identical conditions and the weighings of each set were accomplished as rapidly as possible. The operator worked by numbers, not being conversant even at this stage, with the names or the identity of the several specimens.¹

Dry Extract.—Previous to assay, 5 cc. of each were separately evaporated in beaker glasses ($2\frac{1}{2}$ x 3 inches) by exposure to the drying room temperature of 140° F., the exposure being continued three hours after the alcohol had disappeared. Where large amounts of residue resulted they were stirred occasionally with the tip of the blade of a penknife to insure perfect dryness. The glasses were then simultaneously transferred to a desiccator and cooled ten minutes, then weighed as rapidly as possible. The results expressed in percentages are shown by column No. 2 of the following table.

Chloroformic Extract.—5 cc. of each specimen was abstracted by the first part of the process of the formula for assay (p. 339) and the total chloroformic solution of each evaporated in a beaker glass, by exposure to 140° F. The residues were exposed to the same temperature for six hours after the chloroform had disappeared and were then cooled in a desiccator and weighed. Their weights, expressed in grams and multiplied by 20, gave the percentage shown by column No. 3.

On an average, 3 cc. of glucose solution were required with each specimen.

¹ It is probable that many manufacturers would change places were different specimens to be examined. In the absence of an alkaloidal standard, this series of investigations can only be considered in the light of a systematic study.

TABLE IX.

	No. 1. Crude Alkaloid from 5 cc. Per Cent.	No. 2. Dry Extract from 5 cc. Per Cent.	No. 3. Chloroform Extract from 5 cc. Alkaloid and Fat. Per Cent.
A,	2'56	15'15	4'34
B,	2'47	12'05	4'85
C,	2'09	9'90	3'10
D,	1'86	9'90	2'74
E,	1'86	9'45	2'40
F,	1'70	10'00	3'22
G,	1'63	11'20	3'44
H,	1'62	8'70	2'36
I,	1'60	13'04	2'96
J,	1'02	6'90	2'38
K,	0'93	5'70	1'80
L,	0'72	5'60	1'46
M,	0'60	14'07	2'28
Average,	1'59	10'13	2'87

Alkaloidal Valuation.—From the foregoing residues (column No. 3) the alkaloid was abstracted according to the second part of the formula (p. 339), and the alkaloidal residues obtained therefrom exposed six hours to a temperature of 140° F. in the drying room, and weighed after they had been cooled in a desiccator. These weights multiplied by 20 gave the total alkaloidal percentages as shown by column No. 1.

Remarks.—The most striking lessons that may be learned from this table, is, perhaps, the fact that, so far as the commercial fluid extracts of *nux vomica* are concerned, there is no apparent relationship between alkaloidal and total extractive proportions. If the basis of energy of fluid extract of *nux vomica* is to be estimated from its proportion of natural alkaloid, it is useless to attempt to affiliate total extractives, for they do not correspond at all. In this line of examinations the *extremes* in alkaloidal valuation were first and second in the extractive column. Scarcely nearer relationships seem to exist in the proportions between the chloroformic extracts (column 3), and their respective alkaloids. However, both the members of column 2 and column 3, considered respectively, vary less among themselves than those of column 1, for in neither is the difference between the extremes much more than 3 to 1, while in column 1 (alkaloids) the difference is more than 4 to 1.

In a former paper¹ the author suggested that fluid extract of nux vomica might be standardized at 1.50 per cent. of natural alkaloids, and it will be observed that the average of this series of determinations makes it 1.59. Nine of the samples exceeded that valuation (1.50), thus establishing the fact that should the pharmacopœia require, a higher standard could be accepted or at least attained by manufacturers.

Of the thirteen specimens examined, one only contained a statement on the label concerning its alkaloidal extractive value. A, of the list, stated that the alkaloidal percentage was 2.36 per cent., and the extractive 13.8 per cent. For this reason, this specimen was selected for further consideration.

(9) *Total Extractive (Variation) of Specimen A.*—The maker of this specimen established on the label the extractive valuation of 13.8 per cent. Careful investigations demonstrated that in our hands, as conditions varied, the extractive might range from 11.95 to 15.35 per cent.

By measure, 2.5 cc. evaporated in the drying room at 140° F. and then exposed for four hours, left 0.322 gm. of residue which in twelve hours was reduced to 0.309 gm.

One gm. evaporated in a large flat bottomed dish on a steam bath left 15.35 per cent., and then exposed in a dry-room for one hour left 15.1 per cent., and after six hours' exposure with occasional stirring, 11.95 per cent. remained. This residue submitted to open laboratory air for ten minutes increased to 12.95 per cent., and still continued to increase. An average of the results is 13.84 per cent. which is remarkably near the valuation (13.8 per cent.) of the manufacturer. However, it will be observed that under conditions that might be considered unimportant, the same residue altered materially in weight, enough to cause considerable discrepancies in different assaying reports, were different operators not working under exactly similar conditions. In my opinion allowances for such disturbances must be made in these lines of observation, and exact comparisons cannot be consistently drawn unless details often unmentioned by operators are recorded. That extremely close work is unnecessary, however, at this date, will probably be accepted, if any galenicals are standardized, for even approximate alkaloidal requirements (see

¹ Proceedings Am. Pharm. Assoc., 1891, p. 129.

our Table IX) will be improvements in many products that result from the present process of manufacture.

(10) *Natural Alkaloid of Specimen A*—The maker of this specimen (A of the list) gave the "total alkaloid" valuation as 2.36 per cent. by gravimetric assay, which, being the only commercial sample thus standardized, was selected for comparative assay.

Three assays were made of 5 cc. each for chloroformic residues, according to the first part of the process, the evaporations being made spontaneously, the several residues being exposed for four hours in a drying room at 140° F.

TABLE X.

No. 1	gave 4.66 per cent. chloroformic extract.				
" 2	"	4.30	"	"	"
" 3	"	4.16	"	"	"

In making these determinations, the first was abstracted with three portions of chloroform of 10 cc. each. The second with three portions, one of 10 cc. followed by two of 5 cc. each. The third was abstracted with one portion of 15 cc.

It will be seen that the first gave the best result and supports the rule previously evolved, viz: that to obtain the entire chloroformic extract (fats and alkaloid) the abstraction should be made with at least three parts of chloroform of 10 cc. each. (If a mortar is used, increase the chloroform.)

From these residues the alkaloid was purified in the usual manner (see process, p. 339), and after the evaporation of the chloroform of the rotations, by exposure to the drying-room, was subsequently exposed to 140° F. for four hours.

TABLE XI.

First	experiment gave 2.60 per cent. alkaloid.				
Second	"	"	2.48	"	"
Third	"	"	2.50	"	"
Fourth	(third repeated) experiment gave 2.52 per cent. alkaloid.				

These results were accepted as demonstrating (supporting previous investigations) that, in order to abstract all the alkaloid, three chloroformic washings of the magma with 10 cc. each were required, and, that this was sufficient, was evident, for the remaining magma gave no evidence of alkaloidal reaction, and was not perceptibly bitter to the taste (see p. 344), and it is not probable that a richer commercial fluid extract than this specimen will often

present itself. It is seen that each assay gave a higher average than the manufacturer had established, and every precaution was taken to reduce the residues to constant weight. That the maker slightly under-estimated (preferring probably to understate rather than overdraw) its alkaloidal value seems therefore evident from this series of investigations, which were partly experimental and not designed to establish the highest possible results, and to which may be added the product with specimen A (Table IX), in which the alkaloidal percentage was 2.56 per cent. The average percentage, as shown by five assays, was 2.53 per cent. The difference (0.17 per cent.) between this amount and the valuation stated by the manufacturer being closer than might be expected, considering that the details of methods may have been different, and the conditions of residue exposure such as to lead to unavoidable variations.

(II) *Time Consumed in the Assay.*—(A) The abstraction of the iron magma by means of the mechanical mixer requires five minutes.

(B) The evaporation of the chloroform, if a deep beaker is used, and a steam or water-bath, will be nearly accomplished during the abstraction of the magma A. The several portions of chloroform should be decanted into the beaker successively and the two operations (A and B) may be completed in ten minutes.

(C) The washing of the fatty residue and filtration of the acid solutions will take about ten minutes.¹

(D) The rotations of the aqueous solution of the alkaloid with chloroform require ten minutes.

(E) The evaporation of the alkaloidal chloroform in a deep beaker on a water or steam-bath should be accomplished in a couple of minutes after the last chloroform (D) has been abstracted from the rotator, for these two operations should progress simultaneously, one portion of chloroform being evaporated while the succeeding rotation is being made.

(F) The final exposure of the residue, in my opinion, if the temperature ranges from 140° F. to 175° F., should not require more than fifteen minutes to bring it to a brittle glass-like condition when cold. Total, forty-five minutes.

¹ If, as seems to me desirable, one portion of chloroform (15 cc.) be used to abstract the iron magma A, and one portion of 15 cc. to rotate the aqueous solution D, the time will be much reduced.

LAUDANUM ASSAY.

BY FRANK X. MOERK, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.
No. III.

Objection has repeatedly been made to the U. S. Pharmacopœia process for the assay of opium that it is not applicable to the assay of opium preparations. In the following the writer gives a method that has been very satisfactory in his hands in the assay of laudanum and it can no doubt be used for other preparations. While 70 grams of the laudanum sample in a tared capsule are being slowly evaporated to a syrupy consistence on a water-bath (the water being kept below the boiling point), 2 to 3 grams of the sample are evaporated on a watch-crystal or in a small beaker, so as to ascertain the amount of total solids (this figure should be close to 60 per cent.); it is important to make the syrupy liquid spread over as much surface as possible to facilitate the drying which is completed at a temperature of from 100–105° C. Calculation is then made to find the total solids in the 70 grams taken for the assay; the syrupy liquid from the 70 grams is then made up by adding water to a weight obtained by adding the total solids to 10 gms (10 cc. water). (It has been found easier in the U. S. P. process to thoroughly incorporate the opium and lime with 10 cc. water than with 20 cc., hence the above change). 3 grams slaked lime are then added to the contents of the capsule and thoroughly stirred with a pestle until a uniform mixture results; by the gradual addition of the remaining 60 cc. water this mixture is rinsed into a flask or beaker and then frequently shaken or stirred during one-half hour. After filtering 50 cc. of the filtrate are mixed with 5 cc. alcohol and 25 cc. stronger ether, and after thorough agitation 3 grams ammonium-chloride are added and the U. S. P. directions further followed. In pouring the mixture from the capsule into another vessel a little petrolatum applied to the lip of the capsule will prevent the liquid from running down the outside. Another point in the assay of opium that has been found to help in obtaining uniform results was the drying of the slaked lime at a temperature not above 100° C. to free the slaked lime from excess of moisture; to do this the lime was slaked in a beaker and covered with a watch-crystal, it was then dried until moisture no longer showed itself on the lower side of the watch-crystal.

EXAMINATIONS BY BOARDS OF PHARMACY.

BY JOSEPH P. REMINGTON.

Read before the Pennsylvania Pharmaceutical Association, June 16.

Query 2.—What should be the true aim of Boards of Pharmacy in their examinations; and what should be the nature of the questions put?

These queries, for there are really two here, have been placed in my hands by the Committee for reply. It will be readily observed that if they can be satisfactorily answered and the laws executed that many of the perplexities of State Boards will disappear and the very desirable condition of pharmacy laws fulfilling the expectations of their promoters will be experienced.

To the first query, "What should be the true aim of Boards of Pharmacy in their examinations?" the answer is: (1) To pass the qualified candidates; and (2) to reject those who are unfit to be licensed; and in the writer's opinion no other answer can be given. The true aim of Pharmacy Boards having been easily settled, the second query is encountered, and here the real difficulties are presented. "What should be the nature of the questions put?" Constructive ability is of a far higher grade of merit than that which is destructive; and, it is always easier to pick out flaws in questions, than it is to frame a set which will be thoroughly satisfactory.

The first answer to this question must be, "The nature of the questions put" must be such as will determine the candidate's fitness to have the license, and now the answer must broaden out so that it may cover the subject. An experience of twenty years in framing questions in pharmacy has possibly given the writer some qualifications to answer this question. In the first place, it becomes of the utmost importance for any examiner, no matter what class of candidates are before him, to divest himself of all idea of "getting up a lot of stumpers" or of framing the questions so that they may become pitfalls to the unwary. Every examining body should be held responsible for the character of the questions asked. Pharmacy Boards are unquestionably invested by the State laws with great powers. At their "ipse dixit" they may say to a young man, "Stand down," and down he goes and great is the fall; or if they say, "Come up higher, brother," the candidate is elevated and happiness is his portion.

With many of the Boards the questions asked are never published, and the candidate has no method of knowing how many of the questions have been satisfactorily answered. With some of the Boards, one set of questions serves for all of the candidates; if a certain proportion of the questions are answered, he can reach the mark set for assistants; if a larger quantity of the same questions are properly answered, he is entitled to rank as a proprietor.

Whether this method of determining a man's fitness has the only merit of economy, must be a matter of individual opinion. The writer has carefully examined many of the Boards of Pharmacy questions that have been published, and it must be said that the questions have mainly followed the methods adopted by the colleges of pharmacy; a number of the questions being recognized as having done duty before at a college examination. There cannot be any great objection to this, provided the questions selected are suitable; and this brings up the main question, what is a suitable question to give a candidate?

In the writer's opinion, the questions should be graded. To the candidate for the assistant's certificate, the questions should be mainly directed towards proving whether he is a safe person to be left in charge of the store during the temporary absence of the proprietor; for the certificate that he is given qualifies him in this respect. There are many questions which would be perfectly proper to give a junior student at a pharmaceutical college that are theoretical, and which presuppose him to have a knowledge of physics, mathematics or chemical reactions; for the junior student has just listened to lectures treating of these subjects and the college examination is for the purpose of showing how much of the lecture or instruction has been retained. But, many of these questions would be totally unfit to give a candidate for the assistant's certificate. The College as an institution has the right to ask of her students a certain grade of accomplishments, based upon the instruction given, before permitting the student to pass to a higher class; a grounding in elementary physics and botany, and pharmaceutical mathematics is essential in order to thoroughly comprehend the subjects which are to follow. But the questions which should be given to candidates for the assistant's certificate should be eminently practical. The doses of poisonous remedies, and indeed of all remedies, should form a prominent part of the examination. The relative

strengths and characters of the classes of the pharmaceutical preparations form valuable subjects from which to select questions. Candidates should be drilled on the official names of the preparations, with the English names and synonyms.

In chemistry, the physical and chemical properties of the substances used as medicines form an inexhaustible field for suitable questions. The effects produced by mingling various chemical drugs furnish another source for important queries. Practical familiarity with the subjects should be shown by the recognition of specimens.

For the proprietor's examination, a much higher standard should be fixed. The ability to decipher prescriptions, not only those which are fairly well written, but ones which are difficult, should be a part of the examination. The proprietor should be posted upon properties, doses and physical appearances of official medicines; and he should know at least the doses and properties of the new popular remedies.

Finally, it is not too much to expect the proprietor to show his ability to carry on business by passing a practical examination before the Board, where his competency to perform the duties for which he is given a special license can be demonstrated thoroughly, in the presence of the body which gives him his authority.

AN ESSAY ON SPICES.

BY CHARLES A. HEINITSH.

Read before the Pennsylvania Pharmaceutical Association, June 16.

An essay on the Selection of Spices, asked for by the Association and assigned to the writer, is, or may be considered, an evidence that the sale of spices is a legitimate part, or a legitimate adjunct to a drug store, and particularly to those who aim to supply demands, with the very best articles of the kind obtainable, that are asked for and needed in families.

The innovations of several kinds of business, as grocers, merchandise stores, etc., of keeping so many articles that are the prerogative of a drug store, and so much having been published in the journals and newspapers of the day, about the inferiority and the adulteration of spices sold in open market by manufacturers, grocers, merchandise stores, etc., makes *now* an opportune time *for us*

to fill the want existing in every community. I mean the supplying the best quality of every spice that is wanted, *and this can be done*. All that is required is to know where they are—then select them—and pay a price commensurate with the quality. Quality, not price buyers, we should be. Cupidity for gain must not be considered or allowed.

Spices of high grade are not cheap, but cheapest to the consumer by reason of their excess of flavor, and are more remunerative, for they command better prices, and for the reputation that ensues to the seller.

Here let me emphasize that *purity* means nothing, unless fine quality of whole goods are used in grinding; it is simply a question of how much essential oil and aromatic properties are contained in the crude article; it is *these properties* that make a good article effectual.

The manner and substances used in falsifying and adulterating spices the literature of the day exposes—for that we have no use, unless to learn the tricks—and how to prevent or avoid them.

The assigned subject, the Selection of Spices, suggests that varieties are numerous, *which* and *what* are the best to select from, and keep for sale.

At the present time the plantation or cultivated spices, grown on the Penang or Prince of Wales Islands, lying at the mouth of the Straits of Malacca, such as cloves, nutmegs, mace, etc., are the finest; these are selected at the place of their growth, and afterwards hand picked in London, except cloves, which are cultivated in a distinct class, from finest Penang to commercial Zanzibar, the Amboyna and Bencoolen being intermediate grades.

The *Nutmegs* are unlimed and very large, from 50 to 60 to a pound, rich in oil, and possess a fine, delicate aroma of great flavoring strength.

The *Mace* has the bright, orange yellow color, rich in fixed oil and aroma, the arils being very perfect, evidently being taken off the nuts with much care.

Peppers, the Malabar, Singapore and Tellicherry, black and white, full developed, heavy fruit, well cleansed by sifting and washing, and known as shot pepper, possess the greatest amount of pungency and fine aroma; also the largest amount of piperine and oil.

The Malabar black [a sample exhibited] is a special production,

but expensive; most of this is used in Russia and Germany; the ground Malabar is of an exceptionally fine flavor and pungency; it is now imported into Philadelphia.

Piper longum or *Long Pepper* is a variety that is not frequently called for, except during the fall season for pickling vegetables.

Capsicum.—Several varieties of Cayenne or Red Peppers are grown. The African or bird's-eye coming through the port of Natal, on the west coast of Africa, is unequalled for pungency, fine aroma and the amount of capsacin; this kind is best also for making tincture and fluid extract; the retention of its fine properties is attributed to its being fined, not by grinding, but by cutting knives.

Pimento, Allspice.—Jamaica is the principal source of supply and grows the finest quality; large and small fruits are in the market and generally well cleansed, the small well developed is richer in oil and possesses the fine pungent aromatic odor.

Gingers.—The Jamaica, Cochin-China bleached and unbleached are used more for medicinal than culinary purposes; the rhizome of the African in its natural state is the kind wanted and used in families, and should be selected for its plumpness and weight. It is now conceded that rhizomes cultivated at the Missions, and by other special growers, possess a finer aroma and strength than the wild or East India ginger.

Curcumas we are familiar with; both the long and round are used, but the bright yellow powder is usually preferred for pickling and curry.

Mustards, known as yellow and brown, are obtainable everywhere, colored and uncolored; the fine blends of English and Trieste, or Kentucky grown seed, are *the desirable ones*, and equal to any foreign brands of English, Russian or German. The coloring usually added, when not in excess, does not affect its taste and is not considered an adulterant, but added to make it more sightly, as we add saunders and cochineal coloring to tinctures and elixirs.

The *Cassia*, commonly called *Cinnamon*, known as Saigon, coming from Cochin-China, and particularly the thin quill bark selected from the twigs and smaller branches, known in trade as Java cassia, possesses a different and superior aroma and strength to the ordinary Chinese, though the young thin bark of this variety of bright color, and free from spots of decay, is the kind to select from to supply a trade demand for a lower price article.

Ceylon cinnamon, being rarely called for other than for medicinal purposes, is not considered.

The above are the principal spices, commonly used in families and what the writer supposes No. 6 of the *Queries* calls for.

Samples of cloves, cassia, mace, nutmegs, peppers, etc., are submitted for inspection.

COMPRESSED TABLETS AND TABLET TRITURATES.

BY JOHN H. HAHN, Ph.G.

Read before the Pennsylvania Pharmaceutical Association, June 16.

Compressed tablets and tablet triturates have become very popular of late years, for the purpose of administering drugs formerly prescribed in pilular form, and for preparing accurate solutions for medication; they have almost entirely superseded the old form of medicated lozenges. The increased popularity of this class of preparations may be judged from the fact that in 1888 one per cent., and in 1891 two per cent. of the original prescriptions compounded in a certain store in Philadelphia were for compressed tablets.

The question has been often asked: Does it pay the retail druggist to manufacture compressed goods? This is a very difficult question to decide satisfactorily to all; for there are many who believe the work so laborious and difficult, and their time so valuable that they cannot afford to make them in such quantities as they may require to supply their demands.

While the above statements may be partly true, they are not by any means conclusive; for the practical experience which the writer has had in this particular branch of the profession, has led him to believe that it does pay, both directly and indirectly; and it is also his belief that a tablet compressor will be as necessary in the near future, as a pill machine or tile has been in the past, in order to keep abreast with the advancement of your chosen calling.

A practical illustration of how it pays was brought to the writer's notice some time ago, by a druggist in Philadelphia, who had received a prescription about the first week in January of the present year, for twenty compressed tablets of cocaine hydrochloride of $\frac{1}{6}$ grain each. The doctor not having specified any particular make, it was optional with the druggist whether he made them or

purchased them from some one of the manufacturers. Of the two privileges he chose the latter, and thereby was compelled to buy an original package of 100 tablets at a cost of \$1.08, and 10 cents for car fare, making \$1.18. Twenty of them were dispensed, and the balance still remain in stock, and while tablets of different strengths have been called for, these have not been. Such cases as the above will be frequent; but by being prepared to do your own compressing, you will not only obviate the necessity of carrying a large and unnecessary stock, but will be able to serve your patrons with greater despatch, which is oftentimes quite an advertisement.

The secret of success depends entirely upon having the powders properly prepared, before subjecting them to compression; if you will therefore follow the directions as laid down in Remington's Practice of Pharmacy, together with a little practical experience, you cannot but help to meet with good results. For hypodermic tablets, Dr. H. A. Wilson, of Philadelphia, recommends the use of chloride of sodium as a base, as being less irritant than other substances; but for sulphate of morphine sulphate of sodium, and for acetate of morphine, acetate of sodium should be used.

It is very necessary to keep your compressor in a clean and thoroughly good condition. For this purpose have a chamois skin greased at one end with vaselin, and the piston and barrel should be well rubbed before and after using. It should also be borne in mind that too great pressure should not be used.

Compressed tablets and tablet triturates have every advantage over the pilular form of medicine, and from the fact of their not containing an excipient, which might cause a chemical change, they can be relied upon by the physician with greater certainty, as compared to gelatin or other coated pills.

INFUSION OF DIGITALIS.

BY JOSEPH W. ENGLAND, Ph.G.

Read before the Pennsylvania Pharmaceutical Association, June 16.

At the Scranton meeting of the Association in 1889, I had the pleasure of presenting a paper upon the above subject, and wish now to supplement the facts then given, with further information. In the study of the galenical preparations of a plant, the study of the plant's proximate principles, active and inactive, is the road through

which the best results are obtained. The so-called active principles of digitalis are very numerous, and it is now accepted that many of them are decomposition products—products which have been the result of decomposition of the truly active principles in the plant during plant-life, by the plant acids and saline compounds, as claimed by Kosmann, and products which have been the result of decomposition by reagents, during plant exhaustion and after treatment of extract. The results of the later analyses all show this.

The name digitalin has been given to a number of products, but is now generally reserved for the compound obtained by Schmiedeberg (1874), with which Kosmann's insoluble digitalin is supposed to be identical. It has also been established that the other digitalins, whether crystallized or amorphous, are varying mixtures of Schmiedeberg's digitalin, digitoxin, digitonin, digitalein, and decomposition products. Of these compounds, all, save digitoxin, are glucosides. Including the decomposition products, they may be grouped in two classes, according to solubility. First, those soluble in alcohol and insoluble or almost insoluble in water; second, those soluble in both alcohol and water. Digitoxin and digitalin belong to the first group, and digitonin and digitalein belong to the second group. Hence, it will be seen, that the tincture and fluid extract contain, most largely, digitoxin and digitalin, with some digitonin and digitalein, whilst the infusion contains digitonin and digitalein, with no digitoxin or digitalin. This explains the difference in therapeutical action between the two preparations.

In the paper on infusion of digitalis, previously referred to, it was shown that cold-water maceration was preferable to hot-water maceration, in that less coloring matter and more of the colorless active principles were dissolved; that the toxicity of digitalis very notably diminished when the product of maceration was concentrated by a water-bath; that the English leaves were superior to the German only because the commercial samples of the former were carefully selected and freed from the stalks, thereby reducing the element of variability to a minimum; that the use of cinnamon in the official infusion was objectionable because its presence exerted a retarding influence upon the solution of the water-soluble principles, and that, for the usual quantities of infusion made, one hour's maceration, with occasional agitation, was all sufficient. A formula for making the infusion was presented.

Since that time, my experiments have led me to modify the original formula, but none of the then expressed views. These modifications consist simply in the addition of a small quantity of ammonia water, and a reduction of one-third of the amount of alcohol ordered.

Before considering the new formula let us consider, briefly, a number of changes which the official infusion undergoes when subjected to certain reagents. The freshly made infusion is weakly acid in reaction, and requires the immersion of the litmus paper for a moment before the change becomes evident. The tincture, however, shows the acid reaction more promptly, owing probably to a greater solubility of the acid or acids in alcohol. The amber color of the infusion darkens immediately on the addition of ammonium hydrate, and deepens in color until it becomes a dark red brown, almost green by refracted light. The ammoniated infusion does not decompose until the excess of ammonia has volatilized. This, as a rule, takes some time, especially if the container be well corked. I had, until recently, a sample which had remained permanent for nearly two years before decomposition commenced. If the excess of ammonium hydrate be driven off by heat, the infusion becomes, on the addition of hydrochloric acid, a light reddish orange.

Tannin added to the plain infusion shows no change (absence of digitalin). Fehling's solution gives a deep green color, and in boiling yields a reddish precipitate. Silver nitrate solution, on boiling, is reduced to oxide. Lead oxyacetate solution gives a greenish-yellow precipitate, and the reaction of the infusion ceases to be acid, showing that the acid or acids present form insoluble lead salts. Ferric chloride solution gives a deep green color which, on heating, becomes brown, and on cooling precipitates a dull greenish precipitate; a dark green color is likewise yielded with ferroso-ferric salts. Lead acetate gives a greenish yellow precipitate soluble in acetic acid, which does not turn red on exposure to air (absence of catechin¹). Aluminated gelatin has no precipitating effect, nor have alkaloidal solutions (absence of tannin). A drop of tincture of ferric chloride colors the infusion a deep green, and on the further addition of a drop or two of diluted ammonia water, the green color changes to a deep red brown. This reaction is quite characteristic.

¹ Dragendorff's Plant Analysis, p. 138 and p. 36.

The revised formula is as follows:

Take of Digitalis leaves, bruised,	120 grains.
Water,	14½ fluidounces.
Ammonia water,	90 minims.
Alcohol,	1 fluidounce.

Macerate for an hour, agitating well occasionally, filter, express residue, wash with water, and filter, to make 14½ fluidounces. Now, add 90 minims of ammonia water, 1 fluidounce of alcohol, and sufficient water to make the volume measure 1 pint.

This formula has been used for nearly three years past, and frequent inquiries of physicians, as to the medical value of the product, have always elicited commendation. Further, Dr. H. C. Wood, Professor of Materia Medica and Therapeutics in the University of Pennsylvania, writes me that there can be no therapeutical objections to the use of ammonia water in the quantity and manner described. If the formula should be generally adopted, however, the markedly different appearance of the product from that of the official formula should be pointed out to physicians. The infusion is of a dark red brown color by transmitted light, and greenish black by refracted light.

The official product usually decomposes in three or four days, precipitating. With the ammoniated product, however, there is no change in three or four weeks and longer. At the same time, it is always best to make the product extemporaneously. It may be that the ammonia water exerts its preservative influence by neutralizing the free fatty acids in digitalis. There are a number of acids present in digitalis leaves—the antirrhinic acid of Morin (1845), and the digitoleic acid of Kosmann, with which the digitaloic acid of Walz is probably identical. The percentage of fixed oil in digitalis is relatively high. I was surprised to obtain in 1887 about 5 per cent. A sample is here exhibited. Its reaction now is quite acid. Its reaction when first obtained was not observed.

The oil in question was obtained from Allen's digitalis leaves by petroleum benzin extraction and spontaneous evaporation, in January, 1887. The oil, or rather mixture, as there is evidently present both a volatile portion and a fixed oil, is a dark red brown transparent liquid of a heavy, persistent narcotic odor. It is largely soluble in alcohol, freely soluble in ether or chloroform, and is non-inflammable (showing absence of traces of petroleum benzin). It

leaves a permanent greasy stain on bibulous paper. Its specific gravity is about 0.850. Heated for eight hours at 200–212° F. it lost 5.4 per cent., and also lost its peculiar narcotic odor, becoming more fatty in character. This indicates that the volatile portion lost is the odorous portion.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

Distilled tarwater is stated by Cornéille St. Marc (*Poit. Médical*, 1892, No. 3) to rapidly arrest various forms of hæmoptysis and metrorrhagia, and to be useful in mucous metritis; but its action is uncertain in uterine carcinoma and fibromyoma.

A concentrated solution of boric acid is prepared by Mr. Puaux (*Four. Phar. Chim.*, Feb., 1892), by using boric acid, 200 gm.; magnesium carbonate 35 gm. and water 1,000 cc. The solution has the specific gravity 1.088, is acid to test paper, and contains one-sixth of its weight of boric acid. (See also *Amer. Jour. of Phar.*, 1892, p. 99.)

Calcium salts for therapeutic use.—According to G. Sée (*Méd. mod.*, March, 1892, p. 137) the calcium preparations usually employed in medicine are uncertain in their action because they are absorbed only in minute quantities, a small proportion being eliminated through the kidneys, while nearly the entire quantity passes through the intestines and is rejected without having produced any action. *Calcium iodide* and *calcium bromide* are the salts particularly adapted for introducing iodine and bromine into the organism, the proportion of these elements being greater than in any other medicinal salt. On the other hand, these calcium salts have neither the frequently unpleasant activity of the corresponding potassium salts nor the inertia of the sodium salts. *Calcium chloride* and *bromide* are adapted for use in a large number of dyspepsias and stomachal lesions. *Calcium iodide*, given in small doses, does not in the least derange the digestive organs, otherwise it agrees with the potassium salt in the favorable action upon the respiration, the heart and upon specific diseases.

Calcium tartromalate has been isolated by C. Ordonneau (*Bull. Soc. Chim.*, 3 sér., vi, 261) from the juice of green grapes, and from wine prepared from grapes attacked by mildew. It is a double salt

of left rotating calcium tartrate and right rotating calcium malate, of the formula $\text{CaC}_4\text{H}_4\text{O}_6$, $\text{CaC}_4\text{H}_4\text{O}_5 + \text{CH}_2\text{O}$, and on being treated with sufficient sulphuric acid, yields tartromalic acid, in deliquescent crystals. Some white wines were found to contain a considerable amount of malic acid; this acid gradually disappears in the grapes as they ripen.

Analysis of lead chromate—Chrome yellow, 2 gm., is well shaken with binormal potassa solution, 20 cc., until decomposition has been effected, basic lead chromate and potassium chromate being formed according to the equation $2\text{PbCrO}_4 + 2\text{KHO} = \text{PbCrO}_4 \cdot \text{PbO} + \text{K}_2\text{CrO}_4 + \text{H}_2\text{O}$. The mixture is then diluted with water, the liquid decanted, and the excess of alkali determined with normal sulphuric acid, phenolphthalein being used as an indicator; the amount of lead chromate is calculated from the difference of the alkali as above indicated.—Lachaud and Lepierre, in *Bull. Soc. Chim.*, 3 sér., vi, 235.

Lepidium sativum and *Raphanus sativus* have been grown by P. Lesage and watered with solution of sodium chloride. Such plants produced modifications closely analogous to those observed in the same plants growing near the sea coast, and the stems and roots contained considerable amounts of table salt.—*Compt. rend.*, cxiv, 143.

Nitro-antipyrine has been prepared by E. Jandrier (*Compt. rend.*, cxiv, 303), by dissolving antipyrine in 10 parts of concentrated sulphuric acid, adding drop by drop $\frac{3}{4}$ part of nitric acid, spec. grav. 1.35, and pouring the mixture into cold water; the precipitate, crystallized from boiling acetic acid, forms straw-yellow needles, which melt at 260°C ., and are slightly soluble in alcohol, but insoluble in cold water.

Daturic acid.—E. Gérard has studied the salts of this acid, obtained by him from stramonium seed. (See Am. Jour. Phar., 1890, p. 493.) The normal alkali salts are crystalline, soluble in a small quantity of hot water, precipitated from the solution by table salt, and decomposed by much water with the production of a crystallizable acid salt. The copper and silver salts crystallize from hot alcohol, but are insoluble in water and ether. The lead salt is amorphous and only sparingly soluble in hot alcohol or boiling ether. The acid yields an uncrystallizable bromo derivative $\text{C}_{17}\text{H}_{33}\text{BrO}_2$. On distilling daturic acid over lime *daturone* $\text{C}_{33}\text{H}_{66}\text{O}$ is obtained,

which crystallizes in pearly spangles from hot alcohol, and these melt at 76° C.—*Four. Phar. Chim.*, 1892, 8.

The Oil of Mentha Pulegium, Linné, according to P. Barbier (*Compt. rend.*, cxiv, 126), contains as its chief constituent *puleone*, $C_{10}H_{16}O$, which has a strong mint-like odor, and at 23° C. the spec. grav. 0.9293, boils at 222° , is dextrogyre, and by chromic acid is oxidized to carbonic and acetic acids and silky needles of $C_7H_{12}O_4$ which are probably identical with propylsuccinic acid. Puleone is energetically acted upon by bromine with the evolution of HBr. It combines with hydroxylamine yielding colorless *puleonoxime* $C_{10}H_{16}NOH$, having a strong odor and boiling at 170° C.

The dose of digitalis for the abortive treatment of pneumonia is from 4 to 8 grams of the leaves, given in the form of infusion during twenty-four hours, according to Professor Petresco of Bukharest (*Bull. gén. Thér.*, Paris, Feb., 1892, p. 120). The author states that the tolerance and the non-toxicity of such large doses are proved by observations on 755 cases as published in his *Traité de thérapeutique* in 1884, and in a number of theses sustained before the medical faculty at Bukharest.

Physiological action of kola nut.—After considering all the arguments and weighing the evidence produced in favor of each, Combemale (*Bulletin gén. Thér.*, Feb., 1892) arrives at the conclusion that Professor Sée's view is the correct one, that the action of kola in counteracting the sensation of fatigue depends solely upon the caffeine, of which kola contains two or three times the proportion of that met with in coffee; and that this also explains the success of kola in the treatment of diseases of the heart and in the renovation of strength during convalescence or following intellectual or physical over-exertion. The favorable effects of kola in diarrhoea are due to the tannin present in the drug. (See also *Amer. Jour. Phar.*, 1892, pp. 79, 191, 230.)

Effects of cocaine.—The frequent and continued use of cocaine upon the nasal mucous membrane, according to Dr. Seifert (*Rev. laryngol.*, 1892, No. 6), produces a local paralysis and hypertrophy of the mucous membrane; in addition to these, general effects are noticed, like inability for intellectual work, insomnia and palpitation of the heart. These symptoms improve rapidly after the cessation of the medicament.

The anæsthetic properties of cocaine disappear, according to A. Bignon (*Bull. gén. Thérap.*, Feb., 1892, 170), and remain latent in acid solution, but reappear on neutralizing the free acid, and attain their maximum intensity upon rendering the liquid slightly alkaline. The author prefers the use of what he calls *milk of cocaine*, which is prepared by dissolving the hydrochloride or other salt of cocaine, and adding a very slight excess of sodium carbonate.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

Glycerin Suppositories.—A. Thumann states that when these were first prescribed, they were intended to be made of glycerin and cacao-butter, but owing to the belief of some pharmacists that the two were not miscible the numerous recipes followed in which soap, gelatin and other substances were incorporated. For a number of years he has made a desirable product which melts at the temperature of the body and keeps without change. The cacao-butter is melted at 32–35° and agitated in a prescription vial with an equal weight of glycerin also warmed until the mixture begins to solidify when it is poured into paper moulds.—*Journal der Pharm. v. Elsass-Lothringen*, 1892, 121.

Epidermin.—Under this name a surgical dressing which, by evaporation, leaves an elastic film is introduced; a similar preparation is made by melting 15 parts white wax and triturating in a warm iron mortar with 15 parts powdered acacia until a uniform mass results; to this is then added a boiling mixture of 15 parts each distilled water and glycerin and the mixture stirred until cold. Any medicinal agent to be incorporated with epidermin should be rubbed up with glycerin.—*Oesterr. Ztschr. f. Pharm.*, 1892, 271.

Atomic weight of copper.—Thos. W. Richards, from two series of investigations, concludes that the atomic weight should be somewhat higher than the figure accepted at the present time and finds it to be 63.604 (O=16) or 63.44 (O=15.96).—(*Ztschr. anorgan. Chem.*) *Chem. Ztg. Repert.*, 1892, 165.

Saprol, also called *disinfection-oil*, consists of a mixture of crude cresols containing considerable quantities of pyridine bases and hydrocarbons which presumably are obtained from a petroleum refinery

the addition of hydrocarbons is such that a mixture results which floats upon water.—*Pharm. Centralhalle*, 1892, 305.

Solubility of sulphur in alcohol.—At the boiling point 265 parts alcohol will dissolve one part sulphur; after filtering the solution remains clear, unless agitated, for at least four hours, after which time the excess of sulphur commences to separate, this being complete in about 30 hours; 3,300 parts alcohol at ordinary temperature will then contain dissolved only one part sulphur.—Dr. C. Schierholz, *Pharm. Post*, 1892, 573.

Grindelia robusta.—After reviewing the various analyses published (*Am. Jour. Phar.*, 1888, 433 and 440), Dr. A. Schneegans records results obtained in examining the saponin and in testing for alkaloids. Two kilos of the dry drug, finely cut, were repeatedly boiled with water, the decoctions mixed, allowed to cool and filtered; the filtrate was precipitated with an excess of *neutral* lead acetate, the precipitate collected, washed with a dilute lead acetate solution until the washings ceased to give a precipitate with *basic* lead acetate, and then suspended in water, decomposed by dilute sulphuric acid and the excess of this at once neutralized by addition of lead carbonate. After filtering, the liquid evaporated, left a small quantity of a brown, resinous mass, which was soluble in great part in boiling, dilute alcohol; the addition of three volumes of chloroform to this solution caused a voluminous precipitate; the precipitation was made complete by adding ether to the filtrate, and the precipitate further purified by solution in alcohol and precipitation with ether. Dried over sulphuric acid the precipitate formed a yellowish powder, easily soluble in water and dilute alcohol but almost insoluble in absolute alcohol; the aqueous solution has an acid reaction, foams upon agitation, and reduces Fehling's solution after boiling with acid; lead acetate forms a yellow precipitate soluble in acetic acid; concentrated sulphuric acid dissolves the powder with reddish, yellow color, which upon heating becomes deep red; ammonia, nitric and hydrochloric acid dissolve it with a yellow color.

The filtrate from the lead acetate precipitation was concentrated, filtered and precipitated with *basic* lead acetate, the precipitate being washed and decomposed as above. The aqueous solution of the precipitate was then treated with *neutral* lead acetate to remove the last portions of the substance already described, the filtrate

evaporated to dryness and exhausted with alcohol; this solution gave a precipitate upon addition of ether which after purification and drying formed an almost colorless powder easily soluble in water and dilute alcohol, forming slightly acid solutions; it reduces Fehling's solution after boiling with acid, is precipitated by *basic* but not by *neutral* lead acetate. The *saponin* present, therefore, is made up of *two glucosides*, differing from the saponin isolated by Kobert from senega and quillaja in but one respect, namely, a slightly acid reaction of the one precipitated by basic lead acetate. The filtrate from the basic lead acetate precipitation was made alkaline with soda, extracted with ether, and the thick, brown, alkaline liquid purified by solution in acid, washing with ether, again liberating by soda. The aqueous solution of the substance gives precipitates with phosphomolybdic acid, Mayer's reagent, potassium tri-iodide, tannin, etc., but the quantity of the substance present in the drug is so slight that it appears venturesome at present to speak of an alkaloid in *grindelia robusta*.—*Fourn. d. Pharm. Elsass-Lothringen*, 1892, 133.

Adulterated sodium salicylate.—J. E. Gerock recently came in possession of a sample of sodium salicylate, the red color of which was corrected by the addition of a quantity of salicylate which had been colored distinctly blue. Owing to the minute quantity of coloring matter present it was impossible to identify it, but it is believed to be of artificial organic origin.—*Fourn. der Pharm. Elsass-Lothringen*, 1892, 142.

Capsicum annuum.—An elaborate investigation of this fruit with a view of closer studying the constituent principles, points out the following important results: The *alkaloidal reactions* which point to mere traces are not due to a substance pre-existing, but to some decomposition product formed either by keeping the fruit or during the chemical manipulation; the substance as isolated formed a resinous mass of conine-like odor, and was very easily decomposable by the strong alkalis. In examining the *capsaicin*, attention was also paid to its accompanying substances; ether was found to be the best solvent, as it is extracted more than any other solvent and exhausted the fruit in a short time so that the residue was void of any sharp taste; the ether extract was soluble in other solvents excepting 90 per cent. alcohol; by treating with methyl alcohol the capsaicin was removed from a considerable portion of other constit-

uents; from this solution it was attempted to isolate the capsaicin by evaporation and sublimation at 160° C., but the sublimate consisted of fatty acids carrying along mechanically a little capsaicin. It was possible to separate the fatty acids from capsaicin by precipitation with a methyl alcohol solution of lead acetate; the excess of lead acetate was removed by addition of ammonium sulphate and then by diluting with water the capsaicin and coloring matter was precipitated and then taken up in ether. Subsequent attempts to purify this product failed, the red coloring matter being intimately mixed or combined with the capsaicin (which appears to be an amorphous acid from its behavior towards alkalis, alkaline earths and metallic salts). The accompanying substances were identified as uncombined oleic, palmitic and stearic acids, also a red coloring matter which is not positively identical with carotin, but by saponification was proven to be a cholesterinester of the fatty acids.—H. Pabst, *Archiv der Pharm.*, 1892, 108–134.

Black Phosphorus, obtainable by the prolonged action of ammonia and heat upon ordinary powdered phosphorus, until the powder remaining becomes permanent in air and ceases to smell of hydrogen phosphide, has been proven to be *arsenic*; the ammoniacal solution contains the salts of the lower acids of phosphorus, but is free from phosphates and arsenic salts. The presence of the arsenic in the commercial phosphorus is traceable to the sulphuric acid used in its preparation; the phosphorus is considered to hold the arsenic dissolved, and when acted upon by ammonia may give rise to a red or brown colored powder which, however, disappears after some time, leaving a black, lustreless powder composed of metallic arsenic.—F. A. Flückiger, *Archiv der Pharm.*, 1892, 159.

A Substitute for Goulard's extract.—The action of magnesium acetate solution upon magnesium oxide in hydrating the latter and causing a considerable portion to dissolve, has been made use of in the manufacture of "*sinodor*" preparations as deodorizing agents. Magnesium acetate solutions also have the power of dissolving lead oxide, and this is the basis of a patent for the manufacture of "white lead." A solution containing 4 per cent. lead oxide is also offered as a therapeutic agent in which the action of lead oxide is especially desired. It is made as follows: 187 gm. dilute acetic acid are diluted with water and saturated with magnesium carbonate free from chloride, and water added to make one kilo. After filtering

this, the specific gravity should be about 1.0377, the solution containing 10 per cent. magnesium acetate; it is then heated in a water-bath for one hour with 7 per cent. lead oxide, and by the addition of water the original weight (one kilo) restored; after standing 24 hours the specific gravity is again determined, a difference of 0.001 indicating 1 per cent. lead oxide; if the difference is greater than 0.004 the solution must be correspondingly diluted. From the finished preparation an efficient *lead water* can be made by the addition of 4 parts to 96 parts water.—Dr. Kubel, *Archiv der Pharm.*, 1892, 173.

Anemonin.—In taking up the chemical examination of this substance, preliminary trials were made with a number of plants to ascertain its most productive source. The herbs of *Anemone nemorosa* L., *A. pulsatilla* L., and *A. pratensis* L., *Ranunculus reptans* L., *R. acer* L. (45 pounds yielded 11.5 gr.) and *R. secleratus* L., and the leaves of *Clematis angustifolia* and *C. integrifolia* all contain the principle; the leaves and tubers of *Aconitum napellus* L., probably, although not certainly, also contain it. Of these several herbs, those containing it in largest amount, *A. pulsatilla*, *A. pratensis* and *ranunculus acer*, were used in the fresh state, cut up and distilled in a current of steam; the first distillates, strongly pungent, were collected separately; the later, weaker distillates were used in macerating fresh portions of the herbs. From these aqueous distillates chloroform extracted the pungent principle; by distillation most of the solvent was recovered, and the concentrated solution then set aside to crystallize. *Anemonin* crystallizes first, and after washing with chloroform (in which it is not very soluble) forms odorless crystals, melting at 150–152° C. The mother-liquor from the anemonin crystallization solidified to a mass of hard, lustrous, rhombic prisms, which are called *Anemoncamphor*; this at 150° C., losing water, sinters together; at higher temperature it evolves pungent vapors and carbonizes at 300° C.; it possesses a very sharp, irritating odor, acting especially upon the eyes and mucous membranes of the nose and respiratory organs; placed upon the skin, it first causes reddening, and later produces painful blisters; the chloroform solution is neutral, but decomposes (as does also the aqueous solution), and then has an acid reaction, due to the formation of *anemonin* and amorphous *isoanemonin acid*; if this change is due to oxidation or to the

splitting off of water has not been ascertained. It is due to this decomposition that these several drugs lose their pungency upon drying; it made considerable difference in the yield of the camphor if the herbs were distilled as soon as gathered, or if six or eight days elapsed before doing so. *Anemonin* is colorless, inodorous, tasteless, of neutral reaction, and melts at 152° C.; in the melted state it has a burning taste and produces numbness of the tongue; it is slightly soluble in cold water and alcohol, easier if these solvents are hot—also in chloroform and fixed oils, but not in ether; it is soluble, with yellow color, in aqueous alkalies neutralizing them; it is volatile when boiled with water, the vapors being quite irritating; it readily reduces the salts of the noble metals, also Fehling's solution. It has the formula $C_{10}H_8O_4$, and is the anhydride of a dibasic acid containing an additional aldehyde or ketone group; it is unsaturated, uniting with four atoms of bromine; heating with acetic anhydride produces an isomer, *isoanemonin*. Besides the constituents mentioned, there were found two acids in these herbs: *Anemonic acid*, $C_{10}H_{10}O_5$, a dibasic acid with an aldehyde or ketone-group, can be made by boiling an aqueous solution of anemonin with lead oxide; it forms hard, white needles, melting at 210° C. *Anemoninic acid*, $C_{10}H_{12}O_6$, is also dibasic, and results by warming anemonin with dilute acids, HCl or H_2SO_4 , also with bases like potassa and baryta; it forms a pale, brown powder, melting at $116-117^{\circ}$ C.—H. Beckurts, *Archiv der Pharm.*, 1892, 182–206.

Scopolamine.—The alkaloid *hyoscyne* which has heretofore been considered isomeric with atropine and hyoscyamine, $C_{17}H_{23}NO_3$ really has the formula $C_{17}H_{21}NO_4$, and is identical with a base called *scopolamine* by Prof. E. Schmidt, from the fact that it was first isolated from the root of *scopolia atropoides*; this is not the only source of the alkaloid, since it occurs in considerable quantity in *hyoscyamus* seeds and in certain *duboisia*-leaves, in small quantity in *stramonium* seeds and in *belladonna* root. Commercial hyoscyne preparations were found to consist chiefly of the salts of this base. Scopolamine, $C_{17}H_{21}NO_4 + H_2O$, permanent, transparent crystals, melting at 59° C. to a colorless liquid which, upon prolonged standing does not again become crystalline; the crystals kept over sulphuric acid gradually changed to an amorphous, glassy mass, which then could not be made to crystallize again. The *hydrobro-*

mate, $C_{17}H_{21}NO_4HBr + 3H_2O$; hydrochlorate, $C_{17}H_{21}NO_4HCl + 2H_2O$; hydriodate, $C_{17}H_{21}NO_4HI$; with gold chloride it forms an anhydrous double salt, $C_{17}H_{21}NO_4HCl + AnCl_3$, melting at $212-214^\circ C.$ (not corrected). Scopolamine is a tertiary base and is decomposed by baryta into scopoline ($C_8H_{13}NO_2$) and atropic acid ($C_9H_8O_2$). Scopoline distils at $241-243^\circ C.$ without decomposition and solidifies to a crystalline mass which, recrystallized from ligroin, forms colorless needles melting at $110^\circ C.$ —*Archiv der Pharm.*, 1892, 206-232.

Examination of oleic acid.—The purity of the commercial acid is ascertained by Dr. Hager by (1) the specific gravity 0.895-0.915; (2) solubility in 80 per cent. alcohol and (3) perfect solubility in benzin (presence of water and alcohol causing a turbidity). The second test is for the detection of hydrocarbons. Th. Salzer states in this test while the hydrocarbons themselves are not soluble in 85 per cent. alcohol considerable quantities will dissolve in the presence of oleic acid; he has found an addition of 25 per cent. rosin oil to oleic acid to answer the above requirements and therefore advises the use of a more dilute alcohol sp. gr. 0.860. In adding to 5 cc. alcohol of this specific gravity, there is produced a permanent turbidity on addition of 6 cc. pure olein, 5 cc. olein containing 5 per cent. rosin, 4 cc. olein with 10 per cent., 3 cc. olein with 20 per cent. rosin oil. There is produced a turbidity on adding a small quantity of these adulterated oleins to 5 cc. of the alcohol, but this disappears upon adding more.—*Pharm. Centralhalle*, 1892, 290.

Oxychinaseptol or *diaphtherin*, a new antiseptic in which combination is effected between one molecule ortho-phenol-sulphonic acid (sulpho-carbolic acid, aseptol) and two molecules oxychinoline. It is stated to have the formula:



and forms a yellow powder, easily soluble in water; dilute alkalis and blood cause a separation oxychinoline to which is due its antiseptic value. It is used in one per cent. solution; and is admitted to have one disadvantage, namely, causing a dark precipitate (resembling tannate of iron) when brought in contact with iron instruments which are not evenly nickel-plated, some other metals react in the same way; these colorations are objectionable if any stitching has

to be done since the black spots may not disappear again—Prof. Emmerich, *Pharm. Ztg.*, 1892, 317.

Gravimetric standardization of normal acids.—This depends upon adding to a definite volume of the acid an excess of ammonia water and evaporating to dryness; in determining hydrochloric acid the residue, NH_4Cl , is dried at 100°C . to constant weight; multiply by 0.68224 for weight of HCl ; with sulphuric acid the dry residue $(\text{NH}_4)_2\text{SO}_4$ is finally heated for one-half hour to 120°C .; multiply by 0.742 for weight H_2SO_4 ; with oxalic acid the residue, $(\text{NH}_4)_2\text{C}_2\text{O}_4$, is dried at $100\text{--}105^\circ \text{C}$.; multiply by 1.016 for weight of oxalic acid. This method gives perfectly accurate results if a pure ammonia, which should leave no residue upon evaporation is used.—Dr. H. Eckenroth, *Pharm. Ztg.*, 1892, 317.

Test for veratrine.—Instead of sugar, as used by Weppen in his color test for veratrine, E. Laves uses furfural, the colors obtained being much purer. In a test tube 3–4 drops of a 1 per cent. aqueous furfural solution is mixed with 1 cc. pure sulphuric acid. Of this solution 3–5 drops are placed in a capsule and the substance to be tested applied to the edge of the liquid; a dark blue streak which changes to a green as it traverses across the acid; upon mixing the liquid a uniform dark green color results, which, only after some time changes to a blue or violet.—*Pharm. Ztg.*, 1892, 338.

RAPID METHOD OF SOLUTION IN THE COLD.¹

BY J. B. COLEMAN.

The author found that by simply passing a current of air through the coarsely powdered solid suspended in water complete solution is obtained, in some cases in the space of 15 minutes, and in most cases before the expiration of an hour. The solid is put into a glass cylinder half filled with distilled water. The mouth of the jar is tightly stoppered with an india-rubber cork through which pass two glass tubes. One tube has inserted in the upper end a plug of cotton wool to keep out dust, whilst the lower end is drawn out and bent, and passes to the bottom of the cylinder; the other tube just passes through the cork. Before use, the cylinder is surrounded by a vessel containing water of the temperature at which the solubility

¹ *J. Soc. Chem. Ind.*, 10, 231–233; *Jour. Chem. Soc.*, 1892, 397.

is to be taken; the short tube is then connected with a water aspirator. The advantages of this process consist in the comparatively short time required for solution, and in the circumstance that no expensive apparatus, such as water motors and revolving agitators, are required. In places where high-pressure water is not available, steam may be substituted by attaching a flask of boiling water to the aspirator. The objections to the process are that the solution may be supersaturated by the air causing evaporation during its passage through the liquid; and, secondly, that readily oxidizable substances cannot be examined in this way. The first objection may be overcome by the use of moist air, whilst the second difficulty can usually be met by employing coal gas in place of air, care being taken that the oxygen and carbonic anhydride present in the gas are thoroughly absorbed by alkaline pyrogallol solution.

DETECTION OF ROSIN OIL IN FATTY AND MINERAL OILS.¹

BY A. GRITTNER.

The original process proposed by Storch has only a limited application, as, when sulphuric acid is added to the solution of the oil in acetic anhydride, train oil gives a red color, whilst with cholesterol, present in many fatty oils, a violet one is produced. With dark-colored mineral oils, the process fails altogether. Morawsky has modified the process by using a weaker acid of 1.53 sp. gr. Holde also made use of this acid (without the acetic), but of late, he has increased the strength to 1.624 sp. gr., as with the weaker acid the violet-red color takes a long time to develop. The author found that when mixing rape oil with 1 per cent. of rosin oil, the adulteration may be easily detected by Holde's original or modified process; but Morawsky's method was still more delicate; as it showed $\frac{1}{2}$ per cent. Black rosin oil did not give such a characteristic reaction as was observed with oils of a lighter color. Train oils, before being tested, must be shaken with alcohol, and the alcoholic solution tested for the rosin oil. The reaction is best observed by allowing sulphuric acid to run down the side of the test tube; if rosin oil be present, a red or violet ring will form at the point of contact. With

¹ *Zeit. ang. Chem.*, 1892, 265; *Jour. Chem. Soc.*, 1892, p. 548.

dark-colored oils, Holde's method is the best; but with light-colored train oils, Morawsky's process is preferable. As the reaction is also caused by colophony and shellac, the absence of these substances must be ascertained, and should they be present, it is necessary to saponify the oil and to test the unsaponifiable portion. For dark mineral oils, it is advisable to use an acid of 1.53 sp. gr., as the use of a stronger acid often causes a dark-yellow coloration, which renders the reaction less characteristic. Samples of rosin oil examined by the author gave the reaction with this acid just as plainly as with the 1.624 sp. gr. acid.

Schädler remarks that train oil mixed with syrupy phosphoric acid (5-1) gives a red color, which gradually turns very dark, and is even noticed in mixtures containing only 1 per cent. of the oil. The author never succeeded in obtaining this reaction, and only noticed a dirty brown color. The reaction depends on the nature of the rosin oil. The author occasionally succeeded in detecting an admixture of 5 per cent., but often could not find it at all. The phosphoric acid process is therefore not to be recommended.

REVISION OF CONSTANTS EMPLOYED IN THE ANALYSIS OF FATS AND OILS.¹

BY R. T. THOMSON AND H. BALLANTYNE.

In the table of "constants in oil analysis," which accompanies the original paper, will be found collected that portion of the authors' results which they regard as useful in oil analysis.

Iodine Absorption.—In a previous communication (*ibid.*, 9, 587) it was shown that the variation in iodine absorption for different olive oils was greater than usually stated. Since then, it has been found to be $\frac{1}{2}$ per cent. higher still, so that the iodine value ranges from that of Gioja (79 per cent.) to that of Mogadore olive oil (86.9 per cent.). The lowest figure for rape oil now stands at 99.1, and the highest at 105.6 per cent.

Potash Neutralizing Power.—The figures respecting olive and rape oils are in close accord with those obtained by Archbutt, and do not represent such a great variation between each individual oil as those given by other observers. The limits of five specimens of linseed oil

¹ *J. Soc. Chem. Ind.*, 10, 233-237; *Jour. Chem. Soc.*, 1892, 547.

examined by the authors vary from 19.00 to 19.28, whilst those of nine specimens tested by other observers and recorded by Allen range between 18.74 and 19.52.

Unsaponifiable Matter.—Olive, refined cotton-seed, unrefined arachis, and linseed oils, contain about the same proportion of unsaponifiable matter, so that the determination of that constituent in a sample, say of olive oil, would not serve to show any adulteration with either of the other three oils. But the presence of a considerable portion of rape oil would tend to reduce the percentage of unsaponifiable matter. In marine oils, it is noteworthy that seal oils contain only about one-third of that contained in whale, cod and menhaden oils.

Specific Temperature Reaction.—This is merely a modification in recording the results of Maumene's reaction with strong sulphuric acid. It consists in mixing 50 grams of water with 10 cc. of sulphuric acid, each at 20°, and registering the highest temperature reached. The amount of water is best measured from a pipette at 15.5°, and the sulphuric acid should be run in from a pipette which will deliver the 10 cc. in one minute. During the addition, the mixture should be vigorously stirred with the thermometer, and the highest temperature reached rapidly read off, as it only remains constant for a few seconds. The oil being tested in precisely the same manner, it is only necessary to divide the rise in temperature obtained with water into that obtained by the oil under examination. The answer is the specific temperature reaction compared with water as 100. The oils must be carefully weighed, and the acid added to them exactly as with water, except that even more vigorous stirring is necessary during and after the addition of acid. In this way, the rise in temperature in all the experiments made by the authors was fairly steady up to the highest point, at which the temperature remained constant for 50 to 60 seconds. In the case of linseed, cod, seal and menhaden oils, the tests had to be made with a mixture of 20 grams of these oils and 30 grams of olive oil of known specific temperature reaction. As a rule, an oil having a high iodine absorption has also a high specific temperature reaction, but the rise is not always directly as that in the former. The reason the specific temperature reaction cannot be depended on with the same assurance as the iodine value is that it shows, in some cases, large variations for the same class of oils.

Valenta's Test.—The authors conclude from the results of their experiments that this test is surrounded with too many conditions to be of any practical value in the general analysis of oils.

Oleic Acid.—Although the percentage of free acid cannot be looked on as a constant, the authors consider that it serves a purpose in indicating to some extent the condition of the oil, and shows how little, if at all, a high free acidity affects the results of analysis.

ALKALOIDS OF BERBERIS AQUIFOLIUM AND *B. VULGARIS*.¹

BY C. RÜDEL.

The publications of Wacker, of Hesse, and of Stubbe, on the alkaloids of the roots of *Berberis vulgaris*, and those of Parsons, of Jungk, and of Stubbe on the alkaloids, of the roots of *Berberis aquifolium* show that each contains three alkaloids, and that they are in all probability the same. The chemical formula and the exact description of the salts were not, however, very perfectly defined, and the author has endeavored to complete this part of the work.

The ground up roots were in each case extracted with very dilute acetic acid, and the extract was then concentrated to a syrup. Oxyacanthine was precipitated by sodium sulphate, berberine as acetoneberberine (Gaze's method) and berbamine by the addition of sodium nitrate.

Oxyacanthine, $C_{19}H_{21}NO_3$.—The elementary analyses of the specimens of this alkaloid, as obtained from the two different sources, agreed closely with the above formula. The melting point lay between 174° and 185° ; the base appears to exist in an amorphous and in a crystalline modification. It reacts with the usual alkaloid reagents. The salts prepared were the normal *sulphate*, $(C_{19}H_{21}NO_3)_2 \cdot H_2SO_4 + 4H_2O$, white and crystalline; the *hydrochloride*, $C_{19}H_{21}NO_3 \cdot HCl + 2H_2O$, prepared from the *platinochloride* by precipitating the platinum with hydrogen sulphide, white and crystalline; the *platinochloride*, $(C_{19}H_{21}NO_3)_2 \cdot H_2PtCl_6 + 5H_2O$, a yellow, amorphous salt which could not be obtained crystalline; and the *aurochloride*, $C_{19}H_{21}NO_3 \cdot HAuCl_4 + 4H_2O$, a golden-yellow, amorphous substance, which likewise could not be obtained crystalline.

¹ *Arch. Pharm.*, 229, 631-666; *Jour. Chem. Soc.*, 1892, 641.

These salts of oxyacanthine from different sources were alike in all respects.

Berberamine, $C_{18}H_{19}NO_3$, separated from the solution of the alkaloids by the addition of sodium nitrate, was purified by precipitating the solution of the sulphate with ammonia and recrystallizing from anhydrous ether. Thus obtained, it forms a fine, white, crystalline mass. The specimens from both sources proved to be identical. The following salts were prepared: the normal sulphate, $(C_{18}H_{19}NO_3)_2, H_2SO_4 + 4H_2O$, crystalline; the platinochloride, $(C_{18}H_{19}NO_3)_2, H_2PtCl_6 + 5H_2O$, a light-yellow, amorphous powder; and the aurochloride, $C_{18}H_{19}NO_3, HAuCl_4 + 5H_2O$, a golden-yellow, amorphous powder.

Berberine, $C_{20}H_{17}NO_4$, was most readily separated by Gaze's acetone method. Acetoneberberine, $C_{20}H_{17}NO_4, C_3H_6O$, was obtained as a lemon-yellow, crystalline powder; acid berberine sulphate, $C_{20}H_{17}NO_4, H_2SO_4$, prepared by treating acetoneberberine with dilute sulphuric acid, is a pale-yellow, crystalline salt; the nitrate, $C_{20}H_{17}NO_4, HNO_3$, prepared by treating the acetone compound with the exact quantity of nitric acid, is a crystalline, yellowish-red salt; the platinochloride, $(C_{20}H_{17}NO_4)_2, H_2PtCl_6 + H_2O$, prepared by precipitating the hot solution of the hydrochloride with platinum chloride, is obtained as a yellow, crystalline precipitate; the hydrochloride, $C_{20}H_{17}NO_4, HCl + 4H_2O$, obtained by decomposing the acetone compound with hydrochloric acid, is a light orange-yellow-colored salt.

Since Gaze found a "methylberberine" accompanying the berberine which he obtained from hydrastis berberine, the author converted a considerable quantity of his berberine specimen into hydroberberine, by reduction with zinc and sulphuric acid, and searched very carefully among the crystals of hydroberberine which were obtained for any second substance. No such other alkaloid could, however, be found.

ALLIACEOUS PLANTS AND THEIR PRODUCTS.

BY P. L. SIMMONDS, F.L.S.

[Concluded from p. 329.]

Passing now to the products of the *Ferulas*, the best asafœtida is called *Hing*, which literally means the pure or superior drug. The term *hira-hing* is applied to a treacly liquid found in the centre of the goat skin bales from Kandahar. This form of the drug has from the remotest times been held in great esteem by Eastern doctors, and was once regarded as worth its

weight in silver. It is used by wealthy people in Central India, and has an odor like a mixture of garlic and oil of caraway.

There are two species of asafœtida known in India, namely, *Hing* and *Hingra*. *F. alliacea*, Boiss., produces the first kind, that preferred as a condiment.

F. fœtida, Regel, produces Hingra, the thick, opaque gum obtained from the root, which is the asafœtida of European commerce. But with certain species of *Ferula* different systems of extraction and manipulation, or diversified conditions of climate and soil, may produce both *Hing* and *Hingra*. According to Dr. G. Watt (*Economic Products of India*), it may, however, be safe to affirm that the bulk of the Persian drug imported into India is the *Hing* derived from *F. alliacea*, but that a considerable proportion of the *Hingra* comes also from Persia and Turkestan. The whole of the asafœtida that enters India by the frontier land routes from Afghanistan, is now satisfactorily proved to be derived from *F. fœtida*. India is the largest asafœtida consuming country in the world. The imports in 1888-89 were 10,500 cwt., and about two-thirds of these imports remain in India. The shipments go entirely to the United States, Australia and Mauritius. *Hing* of good quality is worth about £8 the cwt. in Bombay.

Asafœtida is commonly used by the natives of all parts of India as a condiment or flavoring, and is especially prized by the vegetarian Hindu classes in several of their dishes in curries and as sauce for pillaus and especially mixed with their rice, dal or pulse, etc., and is even chewed as a luxury. It is not an article of general consumption in Afghanistan itself. The fresh leaves of the plant, which have the same peculiar odor as its secretion, when cooked, are commonly used as a diet by those near whose abode the plant grows. And the white inner part of the stem of the full-grown plant is considered a delicacy, when roasted and flavored with salt and butter. Although the odors of oil of garlic, oil of onions and asafœtida are similar, the latter contains no trace of allyl.

The imports of asafœtida into the United States were, in 1888, 71,966 lbs.; in 1889, 102,379 lbs., and in 1890, 79,689 lbs. The medicinal uses of asafœtida in Persia are very numerous. There are people in that country who are so accustomed to its use for nervous complaints, that it is like opium to the opium eaters—one of the necessaries of life. Its excellent antispasmodic qualities are too little known and appreciated in Europe. It is a moderate nervine stimulant, an efficient expectorant and feeble laxative, useful in hysterical and spasmodic affections, such as asthma, whooping-cough, angina pectoris, flatulent colic, etc. If taken daily, it is said to prevent the attacks of malarious fever. In ringworm it is applied as a paste.

In 1888, 452 packages of asafœtida came to London, and in 1890, 931 packages.

An essential oil, obtained from the medicinal drug, is dark brown in color, of a strong garlic odor. Sp. gr. 0.984.

Various species of *Ferula* are stated to yield the galbanum gum resin, but it is chiefly referred to *F. galbaniflua*, Boissier. Galbanum occurs in commerce in two forms—in tears and in mass. Very little reaches London, 20 or 30 cases at most yearly. As an antispasmodic, galbanum is far less powerful than asafœtida, but in its stimulating expectorant properties, it is allied to

ammoniacum. Liquid Persian galbanum is derived from an undescribed species of *Ferula*.

The ordinary galbanum of European commerce is the Levant resin. Oil, distilled from the gum, is an excellent substitute for copaiba.

F. rubicaulis, Boiss., does not yield galbanum, but a gum resin of alliaceous odor.

F. communis, Lin., plentiful in Algeria, near the Morocco frontier, yields voluminous tears of a gum resin much resembling ammoniacum.

F. Persica and *F. Szowitziana*, DeC., are said to yield the medicinal gum resinous exudation known as Sagapenum. It is called "Sagbineosch" in Persian, from which the common name is derived. It is met with in the form of yellow, brown or reddish, agglutinated grains, of garlic odor intermediate between asafœtida and galbanum, and of acrid, bitter taste, softening with the warmth of the hand. When heated it evolves a peculiar smell, partaking of garlic and juniper, which is neither so powerful nor so disagreeable as that of the fetid gum.

The root of the horseradish, *Cochlearia Armoracia*, Lin., s. *Armoracia rusticana*, Fl. Wett., s. *A. sativa*, Bernh., has a pungent taste and smell, and contains a volatile oil allied to mustard. Although principally used as a condiment with meat, it is included in the British Pharmacopœia, and considered highly stimulant and diuretic, exciting the stomach and promoting the secretions, and is also antiscorbutic. A volatile oil, known as *scurvy grass oil*, is obtained by distillation from various species of *Cochlearia*, as *C. officinalis*, *C. danica* and *C. anglica*. Density, 0.942.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The Alabama Pharmaceutical Association convened at Mobile, May 10, in eleventh annual meeting. Besides the usual routine business, a discussion was had on perfecting the pharmacy law, and several papers were read on "Preliminary Education," "the National Formulary," and "the Metric System." The next annual meeting will be called at Blount Springs at a date to be announced hereafter, the intention being to adjourn with the view of continuing the meeting in the Alabama building on the Fair grounds in Chicago. The officers for the present year are: Mosely F. Tucker, Mobile, president; P. C. Candidus, secretary, and E. P. Galt, Selma, treasurer.

The Delaware Pharmaceutical Association met at Wilmington, May 5, and transacted chiefly routine business. A paper on *Yucca angustifolia* was read by E. Bostick. N. B. Danforth was elected president; J. J. Gallagher, treasurer; J. M. Harvey, recording secretary, and T. C. Taylor, local secretary for the meeting to be held next year at Wilmington, May 4.

The Florida State Pharmaceutical Association held its sixth annual meeting at the Alcazar Hotel, in St. Augustine, April 12, President Phillips in the chair. The most important business transacted was the discussion on certain defects in the pharmacy law, which resulted in the adoption of several amendments, these being referred to the legislative committee. H. C. Cushman read a paper upon Florida phosphates, and Dr. Phillips one entitled "The thread-

bare subject." The officers for the present year are : N. Woolridge, Jacksonville, president ; W. H. Lightstone, Jacksonville, secretary, and E. Delouest, Ocala, treasurer ; the former secretary, S. P. Watson, declined a re-election, owing to his contemplated removal to Atlanta, Ga. The next annual meeting will be held at Pensacola on the second Wednesday in May, 1893, with Henry C. Cushman as the local secretary.

The Georgia Pharmaceutical Association opened its seventeenth annual meeting May 3, at Columbus, President Slack in the chair. Routine business and legislative affairs received the attention of the association. Besides several papers on general subjects, the following were read : Wine of beef and iron, tincture of chloride of iron, fluid extract of cascara sagrada and medicated waters. E. M. Wheat, Columbus, was elected president ; M. H. Taylor, Macon, treasurer, and H. H. Arrington, Summerville, secretary. Next year the association will meet at Rome, at the call of the president, it being the intention to continue the meeting in Chicago.

The Indiana Pharmaceutical Association, on the occasion of its 11th annual meeting, was called to order by President Buntin, at Indianapolis, May 12. The president's address, the reports of officers and committees, and discussions on legislation, trade interests and on the Paddock pure food and drug bill occupied most of the time at disposal. The officers for the current year are : Frank H. Carter, Indianapolis, president ; F. W. Meissner, Jr., La Porte, secretary, and G. G. Allen, Indianapolis, treasurer. The time and place of the next meeting will be announced by the executive committee.

The Kansas Pharmaceutical Association assembled in the thirteenth annual meeting at Chelsea Park, May 17, president Baker in the chair. The president read his annual address, the other officers and committees made reports, a number of papers were presented on work done by students at the School of Pharmacy connected with the University of Kansas, and several addresses were delivered by professors of the University. M. Noll, Atchison, was elected president ; Mrs. M. A. Miner, Hiawatha, secretary, H. W. Spangler, Perry, treasurer. The next meeting is to take place at Wichita, May 23, 1893 ; local secretary, H. H. Hettinger.

The Kentucky Pharmaceutical Association had selected Carrollton for holding its fifteenth annual meeting, May 18. Routine business, reports of officers and committees and discussion of legislative measures were the prominent features of the meeting, which closed with an excursion on the Kentucky River and with a banquet. The officers for the current year are : O. W. Grier, Carrollton, president ; J. W. Gayle, Frankfort, permanent secretary ; Howard Jett, Cynthia, treasurer, and the local secretary, C. P. Frick, of Louisville, where the next meeting will be held in May, 1893.

The Louisiana State Pharmaceutical Association met at its tenth annual meeting in New Orleans, April 13. The sessions were devoted chiefly to the consideration of the various official reports and of the contemplated amendments to the pharmacy law. The officers for the present year are : L. F. Chalin, president ; Mrs. E. Rudolph, secretary, and E. Lalmont, treasurer. The next meeting will again convene in New Orleans, May 9, 1893.

The Maine Pharmaceutical Association held its third annual meeting, since the reorganization, at Harpswell, June 15, President Partridge in the chair, whose address was of a very comprehensive character. The business transacted consisted in the consideration of the various reports, and of proposed legislative measures. The newly elected officers are: Asa Warren, Bangor, president; H. E. Bowditch, Augusta, secretary; H. B. Pennell, Portland, treasurer, and J. Williamson, Portland, corresponding secretary.

The Mississippi Pharmaceutical Association effected a reorganization at Jackson, May 10, when H. F. West, Natchez, was elected president, D. E. Holt, Terry, secretary, and O. Lillybeck, Meridian, treasurer. The association will again meet at Jackson, May 9, 1893.

The Nebraska State Pharmaceutical Association met in its eleventh annual meeting, June 7, at Grand Island, officially welcomed by its fellow-member, H. D. Boyden, mayor of the city. The annual address by President Evans, the reports of officers and committees, and a discussion on the Paddock pure food and drug bill occupied the attention of those present. Several papers were read, mostly relating to ethical subjects. A paper by C. Dummer, on the *coating of pills with keratin*, described the process followed, using an ammoniacal solution of commercial keratin. No water is to be used in making the pills, and they may be coated thinly with cacao butter to protect the ingredients against the influence of the ammonia; they are fixed upon the points of needles, dipped and rotated in a manner similar to that practised in gelatin coating. The solution is made of keratin 7 p., ammonia water 50 p. and alcohol 50 p. Several coatings are to be applied, the preceding one being previously dried. The executive officers for the ensuing year are: D. J. Koenigstein, Norfolk, president; Julia M. Crissey, Omaha, secretary; and C. R. Sherman, Omaha, treasurer. The next meeting will be held at Nebraska City the local secretary to be appointed later.

The New Jersey Pharmaceutical Association held its twenty-second annual meeting at Plainfield, May 25, listened to the various reports and to several essays, and finally adjourned to meet next year at Atlantic City, May 24. The officers for the year are: R. J. Shaw, Plainfield, president; W. C. Alpers, Bayonne, secretary, and W. M. Townley, Newark, treasurer.

The Ohio State Pharmaceutical Association assembled in Canton, June 14, for holding its fourteenth annual meeting, when 53 new members were elected, and Prof. F. A. Flückiger was chosen an honorary member. A visit to the Deuber watch works and an excursion to Myer's Lake were made on the second day of the meeting. C. N. Nye, Canton, was elected president for the ensuing year; L. C. Hopp, Cleveland, secretary; J. H. Von Stein, Upper Sandusky, treasurer, and John C. Firnin, Findlay, local secretary for the meeting to convene at Findlay, May 9, 1893.

Pennsylvania Pharmaceutical Association.—In the angle formed by the confluence of the North Branch with the Susquehanna River is located the town of Northumberland. Directly opposite, from the right bank of the river, arises a rocky prominence, almost perpendicularly, to the height of 500 feet. From this point, located in the southeastern corner of Union County, a magnificent view is had over the fertile rolling country of Northumberland

County, the view being closed in the distance by various chains of the Appalachian Mountains, those to the southeast skirting one of the principal anthracite basins of Pennsylvania, and those towards the northwest being well supplied with iron ore. The steep cliff is now known as Susquehanna Heights, and upon its summit a hotel has been recently erected named Hotel Shikellimy. It was here that the Pennsylvania Pharmaceutical Association held its fifteenth annual meeting, June 14 to 16.

President J. Patton occupied the chair. Five sessions were held, the first and second sessions being occupied chiefly by the reading of the addresses and reports by the officers and committees, and discussions thereon.

The various reports were ordered for publication, and resolutions were passed favoring the regulation of the practice of medicine by legislation similar to that which had been proposed at the last session of the Pennsylvania legislature; and also declaring in favor of strictly upholding article vii of the code of ethics of the Pennsylvania Pharmaceutical Association, which is in opposition to the giving of medical advice by the pharmacist.

On the afternoon of June 15 the association held no session, with the view of affording the members and their ladies an opportunity of visiting the old home of Dr. Joseph Priestley, the discoverer of oxygen. The party crossed the Susquehanna in one of the little steamers plying between Sunbury and Northumberland, and on landing at the latter town proceeded to the mansion of the Priestley family, where they were kindly received by the ladies of the family and shown a number of relics relating to the philosopher of the past century, and had also an opportunity of looking through the album, commemorating the centenary celebration of chemistry by American chemists in the borough of Northumberland, August 1, 1874. Most of the apparatus constructed by Priestley have been donated by the family to the National Museum in Washington, where they are now preserved. Next a visit was made to the old mansion built by Priestley near the North Branch of the Susquehanna, and to the laboratory, Priestley's workshop, adjoining the dwelling, but now doing duty as a woodshed. The contemplated visit to Priestley's grave had to be omitted, owing to the distance of the cemetery and to the warm weather, it having been found impossible to procure a sufficient number of vehicles for the company.

A number of papers were read on Thursday, and many specimens were shown in illustration of the subjects discussed. Four of these papers are reproduced in the present number of the Journal, treating of Infusion of Digitalis, by J. W. England; Compressed Tablets and Triturates, by J. H. Hahn; Spices, by Chas. A. Heinitsch, and Examinations of Pharmacy Boards, by Prof. Remington.

The percentage of alcohol-soluble matter in asafœtida was discussed by G. W. Kennedy. Ten samples were examined, about four ounces of each being exposed to cold, and then reduced to coarse powder; 200 grains of this powder was then completely exhausted with alcohol and the undissolved portion dried at a slow heat and weighed, the loss in weight indicating the alcohol-soluble matter, which in this case includes also the moisture present in each sample. The percentages of soluble matter were 29.25, 33.60, 41.20, 48.20, 48.40, 50.00, 56.80, 57.50, 58.80 and 68.80, the latter having been labelled "purified German,"

and the two preceding ones "dry tears" and "soft tears," respectively. The undissolved portions proved to be gum and various kinds of earthy matters.

Saccharum lactis.—The paper on milk sugar, by A. J. Tafel, states that this sugar was first recommended as a remedy by Prof. Ludovico Testi, of Reggio, in 1698. The process for preparing it in Switzerland from the whey of cow's milk by evaporation and recrystallization with the addition of a little alum and removing the scum during the boiling, has recently been improved upon by running the whey through animal charcoal, and concentrating the filtrate by means of a vacuum pan; thus prepared milk sugar contains traces of albuminoids and a larger proportion of salts than is found after recrystallization. If the free acid contained in whey be neutralized with prepared chalk, the yield of milk sugar is stated to be increased from about 3 to 4 per cent. An admixture of cane sugar may be detected by Lacrin's process, by heating it, mixed with an equal weight of oxalic acid, by means of a water-bath, when the mixture melts and becomes but slightly darker on continuing the heat; in the presence of one per cent. or more of cane sugar the mass becomes rapidly darker, greenish brown, or even black. About thirty years ago from 40 to 50 tons of milk sugar were annually consumed in the United States; but at present four or five times that quantity are used. Many thousands of gallons of whey are still annually running to waste in this country at the numerous cheese factories; were these utilized, it is believed that milk sugar might, in time, become an article of export, instead of being in great part imported as at present.

Polygala alba.—Specimens of the plant, with root, were shown by Prof. Maisch, the root varying in thickness from almost filiform to $\frac{3}{8}$ inch in thickness near the crown. The party sending it from northern Kansas wrote that the plant abounds in large quantities, and the people would be glad to supply the root.

Aden Senna was also exhibited by Professor Maisch, who had received it from Mr. H. G. Greenish. It consists of the leaflets and some pods of *Cassia holosericea*, which plant is perhaps better known as *C. pubescens* and *C. Schimperi*; it grows in Abyssinia, and though considered inferior to *C. acutifolia*, has appeared in European commerce, owing to the scarcity of Alexandria senna; the leaflets appear to be present in some lots of what is now sold as Alexandria senna in the United States.

The preparation of fruit juices by pharmacists for their own use was recommended in a paper by L. Emanuel as being quite profitable. These juices may be preserved by adding 120 grains of boric acid dissolved in one fluid ounce of boiling water to each quart of the juice. However, the author prefers to convert the fresh juice into syrup.

Asepsis and antiseptis was the title of a paper by Dr. J. J. Edmundson, describing the precautions that should be adopted in preparing dressings as well as at the operating table. Formulas for the solutions used for impregnating dressings were given for *borated*, *carbolated* or *salicylated*, as follows: Acid (boric, carbolic or salicylic) 5 p., glycerin 5 p., and water enough for 100 p. *Iodoform solution*: Iodoform, 10 p.; glycerin, 10 p.; alcohol, sufficient for 100 p. *Corrosive sublimate solution*: Corrosive sublimate, 1 p.; tartaric acid, 2 p.; glycerin, 50 p.; water sufficient for 1,000 parts.

The evils of proprietary medicines were discussed in three papers, the authors of which, arguing from different premises, arrived substantially at the same conclusions, that the professional character of the pharmacist could be retained and his labors be better and more justly remunerated by adopting the course of manufacturing in his own laboratory every medicinal preparation that it is possible for him to make, and by letting the prescribing physicians and the consuming public know that goods of uniform quality and free from the claim of secrecy are made by and obtainable from him. One of the essays concluded by stating that "devotion to your chosen profession, excellence in the manufacture of your own preparations, care, knowledge, hard work, honesty and integrity—and you will succeed in driving from the market the many pharmaceutical nostrums with which it is flooded, and supplanting them with legitimate preparations."

The remaining papers dealt with the sale of drugs and medicines by unauthorized persons, the enforcement of the pharmacy law, and the influence of original papers upon pharmaceutical associations.

Adopting a suggestion made in President Patton's address, the Association voted to hold the next annual meeting in the western part of the State, and after considering various propositions the Committee's report was adopted by selecting Eureka Springs near Sægertown, in Crawford County, as the place, and the second Tuesday of June, 1893, as the time for holding the next meeting. Wm. H. McGarrah, Scranton, was elected president; Wm. McIntyre, Philadelphia, and W. H. Reed, Norristown, vice-presidents; and secretary J. A. Miller, Harrisburg, and treasurer Jos. L. Lemberger, Lebanon, were re-elected to these offices. The appointment of a local secretary was referred to the executive committee and officers of the Association.

The Tennessee State Druggists' Association convened at Tullahoma, May 25, was welcomed by Mayor Marshall, listened to the reports of officers and to the reading of several papers, discussed pharmacy legislation and trade interests, and finally adjourned to meet next year in Nashville. The officers elected are: J. O. Burge, Nashville, president; W. Vickers, Murfreesboro, secretary, and J. F. Voight, Chattanooga, treasurer.

The Texas Pharmaceutical Association had its thirteenth annual meeting in Waco, May 10, President G. H. Kalteyer in the chair. The president's address, the officers' reports and several papers read, furnished material for discussions. It was announced that efforts are being made for the establishment of a chair of pharmacy in the medical department of the Galveston University. Oak Cliff, a suburb of Dallas, was selected for holding the next meeting May 9, 1893. J. Burgheim, Houston, was elected president; G. W. Heyer, Houston, secretary, and F. W. Shook, Dallas, treasurer.

The Utah Pharmaceutical Association was organized at Salt Lake City, April 6 last, by the adoption of a constitution and by-laws, and the election of J. B. Farlow, Salt Lake City, president; C. H. McCoy, Salt Lake City, secretary, and S. P. Ash, Ogden, treasurer. In the evening a banquet was tendered to the young association by the local druggists at the Knutsford Hotel, at which Governor Thomas was present.

The Washington Pharmaceutical Association met at Seattle, May 3, and

elected A. B. Stewart, Seattle, president; W. B. Shaw, secretary, and Jas. Lee, treasurer. The fourth annual meeting will take place at Spokane, May 1, 1893.

The *Pharmaceutical Examining Board of Pennsylvania* held an examination in Harrisburg, April 25, when out of 151 applicants for registered pharmacist certificates, seventy, and of 61 candidates for qualified assistants certificates, twenty-nine received the certificates.

The *Cincinnati College of Pharmacy* had its twentieth annual commencement April 21, at Sinton Hall, on which occasion addresses were made by Dr. Louis Schwab, one of the earliest graduates of the school, by Prof. Fennel and by President Klayer, who conferred the degree of Graduate in Pharmacy upon 29 candidates. After the distribution of various prizes and the close of these exercises, the class was entertained with a supper, participated in by members of the college and alumni.

The *School of Pharmacy of the Kansas State University* held its commencement June 6.

The *Massachusetts College of Pharmacy*, at its commencement, held May 25, conferred the degree of Graduate in Pharmacy, through its president, S. A. D. Sheppard, upon 26 candidates. Addresses were made by Professors Patch and Greenleaf, and by Chas. W. Perkins and G. E. Thomas.

The *National College of Pharmacy* held its twentieth annual commencement at the National Theatre, Washington, D. C., on the evening of June 18, when diplomas were conferred upon twelve graduates.

REVIEWS.

Jahrbuch der Chemie. Bericht über die wichtigsten Fortschritte der reinen u. angewandten Chemie, unter Mitwirkung von Beckurts (Braunschweig), Benedikt (Wien), Bischoff (Riga), Dürre (Aachen), Eder (Wien), Häussermann (Stuttgart), Krüss (München), Märcker (Halle), Nernst (Göttingen), Röhmann (Breslau), herausgegeben von Richard Meyer (Braunschweig). Frankfurt am Main: H. Bechhold. 1892. Svo. Pp. 544. Price, cloth, 12 marks.

Year-book of Chemistry. Report on the most important advances in pure and applied chemistry.

We have before us the first volume of a new annual intended for the publication of classified reports on the more important researches in the different branches of chemical science, and in this manner to give an intelligent survey of the work done and the progress made in each branch, without going into minute details which can be ascertained by consulting the journals devoted to the various branches of science. This "year-book" is, therefore, not intended as a mere compilation of papers published with a more or less full presentation of the details of the investigations made; but rather as a well digested report on such researches and their results determined during the preceding year. To illustrate the manner in which this is done we translate a short paragraph from the section on Pharmaceutical Chemistry, as follows:

"The so-called *synthetic carbolic acid*, which, on its commercial introduction a few years ago, attracted much attention, has now almost completely lost its importance, since it became known that it is likewise subject to the unpleasant

reddening. The cause of this coloration of carbolic acid has recently been investigated by Fabini (Phar. Post, 1891, xxiv, 185); for the production of this effect he found the presence of ammonia, hydrogen binoxide and traces of metal necessary. A carbolic acid, containing ammonia and a metal, rapidly turns red in the presence of hydrogen binoxide on warming; but a carbolic acid, free from metal, is never reddened on the addition of ammonia and hydrogen binoxide. The coloring matter named *phenerythene*, $C_{30}H_{30}NO_4$, is stated by Fabini to be a derivative of quinonimide, the sulphate of which is indigo blue."

To expedite the publication of the year-book the labor has been divided, each reporter presenting that class of investigations in which he is specially interested; thus the "Year-book" is naturally divided into a number of chapters or sections, as follows: Chemical physics, inorganic chemistry, organic chemistry, physiological chemistry, pharmaceutical chemistry, chemistry of articles of food, agricultural chemistry, metallurgy, inorganic industrial chemistry, explosives, technology of the carbohydrates and of fermentation, technology of the fats, chemistry of tar and coloring matters, photography.

The division of the labor thus carried out, insures on the one hand comprehensiveness of each report, and on the other hand the early publication of the work after the close of each year, considerations which are of weighty importance to those who desire to consult such reports. That each of these is as complete as it can possibly be made in the sense indicated above, may be expected from the collaborators, and the usefulness of the book is thus readily seen. The external appearance of the work is in keeping with its internal value and usefulness.

Reagents and Volumetric Solutions proposed for the U. S. Pharmacopœia, together with some specimens of the text proposed. St. Louis. 1892. 8vo. Pp. 40.

This pamphlet has been published for the use of the members of the committee of revision, and the friends who have volunteered their assistance. It is also designed to elicit expressions of opinion relating to both matter and form of the subjects connected with the pharmacopœia.

Manual of the Phanerogams and Pteridophytes of Western Texas. By John M. Coulter. Published by authority of the Secretary of Agriculture, Washington, 1892. 8vo. Pp. 153 to 345.

We have noticed the first part of this Flora on page 421 of our last volume, and now record with pleasure the publication of the second part, embracing the gamopetalæ of the district named in the title.

Manual of Pharmacy and Pharmaceutical Chemistry; designed especially for the use of the pharmaceutical student and for pharmacists in general. By Chas. F. Heebner, Ph.G., Professor of Pharmacy and director of the pharmacal laboratory at the Ontario College of Pharmacy. Third edition. New York: J. H. Vail & Co. 1892. 12mo. Pp. 252.

On the appearance of the first edition in 1888 we have commented somewhat in detail on the scope and character of the work. The present edition is in the main identical with the first; but some of the vague statements contained in the latter have been corrected or modified in the present edition, and a fourth part on urinalysis has been added, covering over twenty pages, and

illustrated with figures of sediments, etc., obtained from urine, as seen under the microscope. The work is valuable as a note book to pharmaceutical students, and as a useful outline of the scope of theoretical and practical pharmacy.

Record of Experiments with Sorghum in 1891. By Harvey W. Wiley, Chemist, etc., with the collaboration of Dr. G. L. Spencer, Mr. A. A. Denton and Mr. Wibray J. Thompson. Published by authority of the Secretary of Agriculture, Washington. 1892. 8vo. Pp. 132.

Bulletin No. 34 of the U. S. Department of Agriculture, Division of Chemistry.

Coca and Cocaine; their history, medical and economic uses, and medicinal preparations. By William Martindale, F.C.S., late examiner of the Pharmaceutical Society, etc. Second edition. London: H. K. Lewis. 1892. 16mo. Pp. 76.

On the appearance of the first edition, in 1886, we noticed this little monograph in the Journal. In the edition now before us, which is printed upon white paper and in larger type than the preceding one, we find that the text has been revised, more especially in that portion devoted to the chemical constituents, the medical uses and the pharmaceutical preparations, and has thus been brought up to date.

The Transactions of the Academy of Science of St. Louis. Vol. v. Nos. 3 and 4.

The transactions extend from October, 1888, to the close of 1891; the double number before us contains various valuable papers on botanical, chemical and other interesting subjects.

Grass and Forage Experiment Station at Garden City, Kan. By Dr. J. A. Sewall.

Co-operative Branch Stations in the South. By S. M. Tracy.

The two papers cover 12 pages of a pamphlet issued by the U. S. Department of Agriculture, Division of Chemistry.

Foods and Food Adulterants.—Investigations made under the direction of H. W. Wiley, Chief Chemist. Part vi. Sugar, Molasses and Syrup, Confections, Honey and Beeswax. Washington. 1892.

This pamphlet comprises pages 633 to 874 of Bulletin 13, Division of Chemistry, U. S. Department of Agriculture.

Special Report on the Extent and Character of Food Adulterations, including state and other laws relative to foods and beverages. By Alex. J. Wedderburn, Special Agent. Washington. 1892. Pp. 174.

Bulletin 32 of the foregoing series. It is a compilation of general statements and special facts from official and other reports, and from letters received in reply to circulars sent out to various parts of the country. The collection of various laws relating to adulterations covers 85 pages of the pamphlet, and affords ample material for comparisons and study.

Fourth Annual Report of the State Pharmaceutical Examining Board of Pennsylvania for the year ending June 30, 1891. Harrisburg. Pp. 107.

It contains the lists of registered pharmacists and assistant pharmacists of Pennsylvania.

Thirty-fifth Annual Report of the Council of the Pharmaceutical Society of Australasia, with which is incorporated the Pharmaceutical Society of Victoria. Melbourne. 1892. Pp. 20.

The report gives a bird's-eye view of the prosperous condition of the Society and of the work done during the preceding year.

Proceedings of the North Dakota Pharmaceutical Association. Sixth annual meeting, held at Fargo, August 4 and 5, 1891. Pp. 75.

Six of the papers read at this meeting were presented by the late Frank Frisby. The next meeting will be held at Fargo, August 2, 1892. L. Christianson, Fargo, is the secretary.

Proceedings of the Ohio State Pharmaceutical Association, at its 13th annual meeting, held in Dayton, June 9-11, 1891, etc. Cleveland. 8vo. Pp. 162.

A brief report of the transactions will be found in our last volume, p. 371. This issue is embellished with the portrait of the late A. Mayell, of Cleveland.

Catalogue of the Hanbury Herbarium, in the Museum of the Pharmaceutical Society of Great Britain. Compiled by E. M. Holmes, F.L.S., Curator of the Museum. London. 1892. Pp. xiv and 136.

Those interested in vegetable materia medica will appreciate the high value of this publication, which gives an insight into the patient and painstaking labor of the late Daniel Hanbury, in his pharmacognostical researches. The notes added by the critical editor supply a good deal of explanatory matter from more recent observations, and show that, with him, this was a labor of love.

State Agricultural Experiment Station, Amherst, Mass. Ninth annual report of the Board of Control, for 1891. Boston: 1892. 8vo. Pp. 352.

It comprises reports on the feeding of various animals, on the cultivation of various crops under different conditions, and on much analytical work done during the year.

Two Addresses upon Joseph Leidy, M. D., LL.D. By William Hunt, M.D. 8vo. Pp. 60.

A Sketch of the Life of Joseph Leidy, M.D., LL.D. By W. S. W. Ruschenberger, M.D. Reprinted from Proceedings of the American Philosophical Society. 8vo. Pp. 64.

These are valued contributions towards a more comprehensive biography of an eminent scientist. The second pamphlet contains an excellent phototype portrait of the deceased.

Der Schutz des Chloroforms vor Zersetzung am Licht und sein erstes Vierteljahrhundert. Zeitgemässe historische und chemische Studien von Dr. Ernst Biltz, Apotheker in Erfurt. Erfurt: A. Stenger. 1892. Pp. 58.

The protection of chloroform from decomposition on exposure to light, and its first quarter-century. Appropriate historic and chemical studies.

A very interesting and valuable monograph, in which the influence of light in the presence of air upon pure chloroform is shown, as well as the partial protective influence of alcohol, and the absolute protection through the exclusion of light; for practical purposes, both agencies are required in order to preserve chloroform unaltered.

OBITUARY.

Dr. William Dymock died at his residence, Malabar Hill, Bombay, April 30, of influenza. He joined the Bombay medical service in 1859, was for a couple of years attached to the Indian navy, and in 1871 was appointed medical storekeeper to the Indian Government, in which position he largely increased the local manufacture of galenicals, introduced the most improved machinery for their manufacture, and increased the efficiency of the pharmaceutical department of the service. To the world at large he rendered eminent service through his researches on the materia medica of India. Beginning with his paper on the asafœtidas of the Bombay market in 1875, a number of his contributions to materia medica have been republished in this Journal. The last publication in which he was engaged as one of three authors is that of the *Pharmacographia Indica*, of which the sixth and last part was not quite completed at his death; the five parts published have been duly noticed in this Journal. In 1887, Dr. Dymock was deservedly honored by being awarded the Hanbury Medal. Previous to that time he had been made an honorary member of the Pharmaceutical Society of Great Britain, and also of the Philadelphia College of Pharmacy.

Henry F. Formad, M. D., died suddenly in Philadelphia, June 5, in the forty-sixth year of his age. He was born in southeastern Russia, served as assistant surgeon in the Russian army, escaped threatened arrest on the charge of nihilism, and continued his studies at Heidelberg, where he graduated, and afterwards at the University of Pennsylvania, graduating from this institution in 1877; subsequently he became demonstrator of pathology, which chair he held until his death. He was well known for his pathological researches, and as an expert in medico-legal questions. For more than eleven years he had been coroner's physician.

George W. Pancoast, Ph.G., died at the Pennsylvania Hospital, June 23, aged 30 years. The deceased was an apprentice of the late J. W. Worthington, Moorestown, N. J., and graduated from the Philadelphia College of Pharmacy with the class of 1885. While charging a soda water tank at the Stackhouse pharmacy, on June 14, the gas being passed through a rubber hose into the tank, the latter exploded, causing compound fractures of the right thigh and leg, necessitating the amputation of the injured member. Death resulted from exhaustion, due to secondary hemorrhage. The deceased was a careful, conscientious pharmacist; he became a member of the College shortly after he graduated.

George Webb Sanford, a distinguished British pharmacist, died May 16, 1892, at Cromer, in the same house in which he was born in 1813. It is said of him that, since the death of Jacob Bell, he had achieved more substantial good for pharmacists than any other member of the Pharmaceutical Society of Great Britain, of whose Council he was a member for twenty-four years, serving part of the time as vice-president and as president. It was during his presidency and largely due to his efforts that the British Pharmacy act of 1868 was passed.

THE AMERICAN JOURNAL OF PHARMACY.

AUGUST, 1892.

EXAMINATION OF COMMERCIAL HYPOPHOSPHITE PREPARATIONS.

BY FRANK X. MOERK, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.
No. 112.

In connection with other contributions on the *hypophosphites*, published in the American Journal of Pharmacy during the last few years, it was thought desirable to embrace an examination of the more soluble hypophosphite preparations as found in the Philadelphia market. The object was to ascertain the quantity of hypophosphites in preparations the formulas of which are kept secret; in others to make comparison of the quantity found and that claimed to be present, and lastly to allow a comparison to be made of these several preparations with those of the U. S. Pharmacopœia and the National Formulary.

The basic constituents were only qualitatively tested for; the metallic constituents generally being tested for in the residue after ignition. The alkaloids were extracted by diluting the preparations with water, rendering alkaline with sodium hydrate and agitating with chloroform; a little of the chloroform residue with sulphuric acid and a fragment of potassium bichromate revealed the presence or absence of *strychnine*; a larger portion of the residue dissolved in dilute sulphuric acid by its fluorescence, by the thalleioquin reaction, and by yielding a white precipitate with ammonia, readily soluble in excess, indicated *quinine*.

Of the several methods for the estimation of hypophosphites the one with mercuric chloride only was available since the other methods in presence of organic substances, like sugar, etc., give erroneous results. Having quite a number of these determinations to make it was found to be of advantage to ascertain the mercurous chloride

produced by a volumetric method instead of drying at 100° C. and weighing. All results are expressed in terms of *free hypophosphorous acid*, since the basic constituents varied in the several preparations. From 2-5 grams (in the first determination the smaller quantity was taken, and if the preparation was found to be *weak*, the larger quantity was taken in the duplicate) were diluted with 25 cc. water, 1 cc. concentrated hydrochloric acid and 25 cc. of a cold saturated solution of mercuric chloride added; after heating for one hour in a water-bath at 100° C., the separated mercurous chloride was filtered off, thoroughly washed with boiling water, allowed to drain, dropped (filter and precipitate) into a glass-stoppered bottle containing 10 cc. potassium iodide solution (10 per cent.) and 5 cc. dilute sulphuric acid, and agitated for several minutes; tenth-normal solution of iodine was then run in from a burette until the liquid in the bottle was distinctly brown in color after frequent agitation during ten minutes; the excess of iodine, finally, was titrated with tenth-normal solution of sodium thiosulphate. By subtracting the cc. of thiosulphate solution from the cc. of iodine solution and multiplying the difference in cc. by 0.00165 the quantity of hypophosphorous acid (free and combined) present in the weight taken will be obtained.

The tabular statement explains itself:

Number of Sample.	Specific gravity at 25° C. compared with H_2O at 25° C.	Hypophosphorous acid; grains per fluid ounce.		Basic constituents present. Q = Quinine. S = Strychnine.
		Found.	Calculated from formula.	
1, . . .	1'109	0'366	—	K, Na, Ca, Fe, Mn, Q, S
2, . . .	1'299	2'232	—	K, Ca, Fe, Mn, Q, S
3, . . .	1'284	1'615	—	same
4, . . .	1'286	1'207	—	same
5, . . .	1'291	26'175	26'520	K, Na, Ca
6, . . .	1'285	24'313	24'764	same
7, . . .	1'285	24'564	24'764	same
8, . . .	1'278	24'710	24'764	same
9, . . .	1'225	31'478	} at least	K, Na, Ca, Fe
10, . . .	1'225	31'071		same
11, . . .	1'321	22'020	23'988	K, Na, Ca, Fe, Mn, Q, S
12, . . .	1'337	7'695	—	Na, Ca
13, . . .	1'308	12'618	14'210	Na, Ca
14, . . .	1'293	2'893	3'518	K, Ca, Fe, Mn, Q, S
15, . . .	1'290	11'792	10'584	K, Na, Ca, Fe, Mn, Q, S
16, . . .	1'335	19'461	27'462	K, Na, Ca
17, . . .	1'297	4'184	9'935	Na, Fe, Mn, Q, S

Some remarks upon these samples may prove interesting reading:

1 is a preparation extensively advertised as a "tasteless preparation of cod liver oil and the hypophosphites;" in appearance and properties it forms a splendid example of an elixir, the taste of which is not rendered unpleasant by homœopathic doses of hypophosphites, nor is the odor affected by substituting iodine for its equivalent of cod-liver oil.

2 is a "proprietary" and has been "made" such a success that numerous imitations are being offered to the trade; of these imitations 3 and 4 are examples. The samples so far (1-4 inclusive) probably owe more of their medicinaleffect to the alkaloids than to the small quantity of hypophosphites 5, 6, 7 and 8 are samples of the official syrup of the hypophosphites; 5 containing free H_3PO_2 in place of citric acid, 6 strictly U. S. P.; both of these were made by me; 7 (recently made) and 8 (in stock for at least two years, during which time it had been repeatedly exposed in a partly filled bottle to direct sun-light) were obtained from a wholesale house; these samples show no difference in quantity of hypophosphite, although 8 was very much darker in color.

9 (old) and 10 (new) are Syrup of the Hypophosphites with Iron; they are not made according to the U. S. P. (which preparation speedily deposits insoluble ferric hypophosphite produced by the oxidation of ferrous hypophosphite when in contact with air and in presence of other hypophosphites; the ferrous hypophosphite formed by double decomposition of the ferrous lactate and the alkaline hypophosphites), but start with ferric hypophosphite and retain this in solution by the addition of some free hypophosphorous acid.

11, Syrup. Hypophosph. Comp. of the National Formulary; in this the precipitation of ferric hypophosphite is prevented by the presence of an alkaline citrate.

12 to 17, inclusive, illustrate the great army of special preparations placed upon the drug store shelves through the conversion of the practitioners by free samples, etc. As the results show, there are a number of these preparations, which excite suspicion that they never contained the quantity of salts which the labels state to be present.

It is hoped that the results obtained in the investigation can be used by pharmacists in convincing the physicians of their acquaint-

ance who are addicted to this weakness that there are preparations which can be made by the authority of the Pharmacopœia and National Formulary containing as much of the remedial agents in an ounce as some of their favored specialties contain in a pint.

THE CULTIVATION OF COFFEE IN JAMAICA.¹

BY C. G. LLOYD.

The island of Jamaica exports each year between eight and nine hundred thousand pounds of coffee, valued last year at a million three hundred and sixty thousand dollars, and the product was last year 15.7 per cent. of the total exports from the island. In former years the great bulk of this coffee went to England; thus only ten years ago, England got 73 per cent., while the United States only received 13 per cent.; but beginning with 1884 the States have taken a large proportion of the product, and last year received 45 per cent., the year before 57 per cent. I am very sorry to have to report, however, that the United States only gets the poorer grades, the English paying a better price for the choice grades. The best coffee of the island is raised on the Blue Mountains, in the parishes of St. Andrew and St. Thomas, the eastern end of the island, which coffee almost entirely goes to England. I am informed by the planters of Manchester parish, who sort their coffee, that their best grades, also, go to England.

Jamaica (and also Hayti) coffee is of an average good quality, a little stronger than Java or Mocha, but not so strong and rank as the Rio. A large New York importer of West Indies products told me that a certain coffee firm, whose name is a synonym for wealth, had made a fortune in the last half dozen years, selling roasted Jamaica and Hayti coffee as "choice Java." I presume every one who knows nothing of the subject, has an idea how coffee grows, even if it is erroneous. We naturally imagine that it grows on trees like cherries, and I had expected to see a coffee plantation look like a cherry orchard.² When I left Kingston by rail for the

¹ Read before the American Pharmaceutical Association at the Profile House, N. H., July 16.

² My impressions had been formed from the picture plate 10, of the recent French work, "*Plantes Médicinales*," of Dujardin-Beaumetz and Egasse. This plate is so grossly inaccurate, not only in regard to the character and apparent

interior of the island, a couple of weeks before Christmas, having been told that the coffee berries were then ripe, I kept a sharp outlook for the coffee trees, but saw nothing that I could take for them. On arriving at the station, I walked along the single road or street of the little village of negro huts, and chancing to stop by the side of a copse of tangled bushes which I took for a wild growth, I noticed a few coffee berries on the ground under the bushes, and on investigating found that these bushes were coffee shrubs. I tried to think of what they reminded me at home, and nothing conveys to my mind a closer comparison than a tangled undergrowth of Wahoo shrubs.

The bulk of the coffee of Jamaica is raised by small growers—negroes, who own from a half to five acres of ground, and who plant the shrub around the place without any order or system whatever, and apparently give the shrub no attention, excepting to break off occasionally the tops when they get too high or to cut off a few dead branches. In the statistics of the island, where the estates are specified which raise fifty acres or more of coffee, only thirty estates are named, comprising about 3,000 acres, while the acreage of small holders, less than fifty acres, is nearly 18,000. These small growers, of course, for the most part have no machinery for preparing or sorting the coffee. Almost every negro hut in the coffee districts has in the yard what they call a "barbicue." It is a flat drying surface, built where the sun will strike it, and reminds one of a square tray on a large scale, built of brick with raised edges and cemented smooth. The usual size is from twelve to twenty feet square. The negroes gather the coffee berries when they get ripe, a few each week, somewhat like we would pick gooseberries, one at a time. They put the berries into a wooden mortar and beat them, which separates the outer skins, which are washed away in buckets of water. The seeds are then put on the "barbicue" to dry. Without a close examination at this stage the product resembles large grains of coffee mixed with the imperfectly separated outer skins, but on closer observation we notice that each grain of coffee is enclosed in a thick, tough, cartilaginous skin. When the coffee has

size of the coffee tree, but also to the size, shape, color, and cluster of the berries, that it is a discredit to that otherwise very excellent work. A good illustration of a coffee branch is plate 106 of the German work just completed, "Köhler's Medicinal-Pflanzen-Atlas."

been dried on the "barbicue" this skin becomes brittle, and the negroes again beat it in the mortar to hull it out of this skin. Then the seeds are picked over by hand, the better part of them being sold to the little stores throughout the country, which we notice with the sign out, "Licensed to deal in agricultural products," and which pay Her Majesty's government two pounds each per year for the privilege. These small storekeepers send it to Kingston, from whence it is shipped abroad. Coffee merchants in Kingston, and some of the merchants in the smaller towns, sort the coffee into grades according to size and weight of the berry. Most of the sorting is done by hand, though some have sizing machines, as described further on.

On coffee plantations the same process is gone through, but on a larger scale, more systematic, and with the aid of machinery. The coffee shrub thrives best on new land, hence the portion of the plantation devoted to coffee growth is virgin soil cleared of its forest for this purpose.

Around Mandeville, in Manchester parish, the land is now almost all pasturage, and I am told that the whole of it was originally cleared off for the growth of coffee many years ago in slave times, and having raised its crops of coffee and exhausted the ground for this purpose, it was sown in Guinea grass and used for grazing. To establish a coffee plantation the land is cleared of its trees, burnt over, and cleaned up. Then it is laid out by pegs into squares of six feet, and young coffee sprouts about a foot high are planted near each peg. These sprouts are generally obtained from beneath old shrubs, and are adventitious growths from seed dropped from the shrub, though sometimes nurseries are established for raising the young sprouts from planted seed. In these tropical regions, weeds and vines and wild growths of all kinds spring up very quickly, and with these the planter is constantly at war. Four times a year, at least, the fields should be gone over with a hoe and the weeds cut down. In three or four years the young coffee plants begin to bear, and the shrubs continue giving crops for about thirty years. The shrub, if left to grow, would reach a height of twelve to fifteen feet, but on a plantation they are topped when about four feet high, and kept to about this height by breaking off the tops and such suckers as appear. The branches are slender, and when the shrubs are not crowded, spread nearly horizontal. The leaves are evergreen (as

indeed are most of the shrubs and trees in the tropics), of a firm texture, smooth and shiny above. They are opposite, oval, entire, and borne on short petioles about one-half an inch long. They are three to five inches long, two to three inches wide, and are terminated by acuminate points.

The flowers are white, borne in clusters of three to six in the axils of the leaves, and are exceedingly fragrant. The petals are five, slender, spreading. The shrubs begin to blossom in February and continue in flower up to May; the fullest bloom is in March and April. Coffee does not blossom as our fruit trees, all at once, and go out of bloom in a week or two, but continues to bloom for about four months, and the crop in consequence ripens through the same length of time, and the planters are thus enabled to gather and care for it to better advantage than if it all ripened at once. The coffee season lasts from September to December, September and October being the principal months. The coffee berries are borne on short stalks in clusters of three to six in the axils of the leaves. When ripe they are about the size of cherries, but are oval (not globular), and slightly compressed on the side. Each berry consists of two seeds (familiar to us as the green coffee of commerce), each seed enclosed in a thick, tough white skin called the parchment skin, placed in the berry with the flat surfaces together, and surrounded with a small quantity of sweetened pulp, the whole enclosed in a thick skin like a Malaga grape. The color of the skin when ripe is red, not a bright red like a cherry, but a pale dull red.

The berries are picked by negro and coolie women, who go over the coffee shrubs, picking the ripe berries into baskets, and are paid by measure. The price varies according to abundance of the berries, but is regulated so that a woman makes about ninepence (18 cents) a day. Rats are very fond of the sweetish pulp that surrounds the coffee grains, and they climb the shrubs and gnaw off a great many berries. Birds are also said to pick them, and lizards—which are very numerous in Jamaica—are charged also with despoiling the fruit. This “rat” coffee is picked from the ground by the women, and comprises about one-fourth of the crop. It furnishes a larger proportion of heavy grains than the berries gathered from the shrubs, as the rats are credited with selecting the largest and best berries, and it is kept separate in all the subsequent operations. As the bulk of this coffee is supposed to be gnawed off by the rats, all

coffee picked up from the ground is called "rat coffee." It costs about double to gather it as when picked from the shrubs.

The women bring the berries to the works, where they are measured and paid for by the "Busher," as the overseer of a coffee plantation is called. To prepare the coffee for market the berries are first run through a machine, called the "pulper," which tears off the outer skins and pulp. A "pulper" is simply a large cylindrical wheel about three feet in diameter and two feet long, covered with corrugated iron, like a nutmeg grater, and arranged so that it revolves so close to another corrugated iron surface that the berries cannot go through entire, but are caught by the rough surfaces and torn to pieces, the skins and pulp being carried through, the seed dropping beneath into a tank of water. The water serves to wash the grains, and also to separate the light from the heavy coffee; the former floating, are skimmed off; the latter sinking, are taken from the tank after the water is drawn away. Heavy coffee is much the better grade, and it is kept separate from the light in all subsequent operations. At this stage the coffee seeds are still enclosed in the "parchment skins," which are tough and cannot be separated from the seeds when green; hence the next process is to thoroughly dry the seed in order to make the "parchment skins" brittle so they can be hulled off. For this purpose the seeds are spread on "barbicues" similar to those previously described, only, of course, on a larger scale. The "barbicues" of an ordinary sized plantation cover about an acre of ground, and are usually built on sloping ground and terraced. When it threatens a shower, and every evening to protect it from the rain and dews (which are heavy in the tropics), the coffee is raked into a pile in the center of each "barbicue" and covered with a wooden cover-shaped hopper. From ten days to two weeks' exposure to the sun on the "barbicue" will dry the seeds so that they can be hulled. The "huller" is a large wooden wheel, arranged to revolve like the wheel we see in brickyards, but running in a circular narrow trough. The coffee is placed in this trough, and the wheel constantly running over it breaks off the brittle "parchment skins," being heavy enough for this purpose, but not so heavy as to crush the seeds. The coffee seeds are separated from the broken "parchment skins," called trash at this stage, by being run through a "fanner," similar to the fans of our threshing machines, which blows off the trash. There still remain closely

adhering to many grains of coffee thin light gray skins, called "silver skins," which would hardly be noticed by the ordinary observer. To remove these skins and brighten the grains of coffee it is further dried in the warehouse for two or three weeks, and again put through the "huller" and "fanner." The next step is to separate the "pea berry coffee." A small percentage of the coffee berries, instead of containing the normal two seeds, have by abortion only a single seed. The grains of these single-seeded berries, instead of having a flat face, are rounded, and are called "pea berries." These "pea berries" are heavy and of the best quality, and bring a better price than the best grade of flat-faced grains. To separate them the coffee is run into a cloth belt slowly revolving at a slight inclined plane, the flat-faced grains being carried over the top, the rounded "pea berries" rolling off the bottom.

The coffee is next graded according to the size of the grains by being run through a "sizer." This is a cylindrical screen, consisting of four sections of different sized meshes, the smallest holes near the top. The screen revolves at an incline, and the different sized grains drop through the various sections according to size into bins beneath, the largest grained and best grade being carried through the cylinder.

Finally the coffee is given to women who spread it on a table and pick out all the deformed or broken grains, which are called the "tringe." The best grades of coffee are put in tierces holding about 800 pounds, and mostly shipped to England—the poorer grades and "tringe" into barrels or bags for this country.

I have given a description of the machinery which I saw in operation on the plantations. There are improved machines, I am told, but they are said to furnish no better results than the old ones.

In concluding this article, I wish to acknowledge my indebtedness for information and other courtesies to John H. Nosworthy, the "Busher" of Somerset Plantation.

VERBENA URTICÆFOLIA.

BY ROBERT M. MCFARLAND, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.
No. 113.

The leaves of this plant have acquired some reputation in domestic practice, as a tonic; the usual mode of administration has been as

a decoction. The fresh root is also considered to be of some medicinal value, an infusion of the root having been administered with assured advantage in intermittent fevers. The taste of this infusion would lead one to suppose the medicinal activity to be due to a bitter principle.

In view of the above statements concerning this plant, it was thought that a chemical examination of the root might be of interest. For this purpose a quantity was collected by the author near Henderson, Kentucky, during the summer of 1891. It was carefully dried, and a proximate analysis made during the past winter, with the following results.

Fifty grams of the dried and finely powdered root were extracted with petroleum ether, which removed 0.91 per cent. of a substance consisting of a volatile oil, fat and caoutchouc. Stronger ether extracted from the remaining drug 0.55 per cent. of resin.

Absolute alcohol next extracted 2.74 per cent. This extract was found to possess the bitterness of the original drug. It was therefore dissolved in a small quantity of alcohol, and poured into acidulated water. The solution thus obtained was filtered from the precipitated resin, and found to hold the bitter principle. This aqueous solution was then agitated with petroleum ether, followed by an agitation with ether. Both of these solvents removed a crystalline substance, the character of which was not fully determined, but from experiments made with it appeared to be an acid. The aqueous solution was then agitated with chloroform, which extracted a substance with a bitterish and slightly nauseous taste. This amorphous principle was dissolved in water, and a portion tested for glucose with Fehling's solution, which gave a negative result. Another portion was then boiled for fifteen minutes with very dilute hydrochloric acid, neutralized and tested with Fehling's solution, which now gave abundant evidence of the presence of glucose. This principle, therefore, with a taste identical with the original drug, was undoubtedly a glucoside. The aqueous solution remaining from the agitation with chloroform had lost its bitter taste, and nothing further was removed by making it alkaline and again extracting with the above immiscible solvents, this indicating the absence of an alkaloid. The above glucoside was not further examined on account of the difficulty, at that season of the year, of obtaining a further supply of material from which to extract it.

It is suggested, however, that a method of preparation would be to extract the drug with alcohol, recover the solvent by distillation, and pour the residue into acidulated water. After standing a short time the mixture may be filtered to remove resin, and the acidulated aqueous solution agitated with ether to remove remaining resin and acid principle, and then with chloroform to extract the bitter glucoside.

The original fifty grams of drug, after treatment with absolute alcohol was extracted with successive portions of distilled water. This solvent removed 18.45 per cent., consisting of mucilage 2.40 per cent., dextrin 5.28 per cent., glucose 5.32 per cent., and saccharose 4.84 per cent. There were further found by appropriate solvents, pectin and albuminoids 3.84 per cent.; starch 1.76 per cent. The cellulose, lignin and incrusting matter amounted to 40.51 per cent. The ash was found to be 13.82 per cent., and the moisture 10.80 per cent.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

Oil of turpentine in lemon oil.—Oliveri (*Gazetta chim. ital.*, xxi, 318, through *Rep. de Pharm.*, 1892, p. 221) examining oil of lemon for adulterations uses a polarimeter of Laurent with a 20 cm. tube. The rotatory power for pure lemon oil is $+120^{\circ}$ and for turpentine -55° . The rotatory power of mixtures is seen from the following table:

2 parts of turpentine in 100	=	116.5°
4 " " "	=	113.00°
6 " " "	=	109.5°
8 " " "	=	106°
10 " " "	=	102.5°
15 " " "	=	93.75°
18 " " "	=	88.50°
20 " " "	=	85.00°

The examination is made at ordinary temperature $15-20^{\circ}$, variation having no effect on the observations.

Use of the fruit of Sorbus Aria in Asia Minor.—Duchesne (*Rep. de Pharm.*, 1892, 227) calls attention to these fruits which are about the size of a small nut and are known in Asia Minor under the name of idé. The inhabitants make use of the pulp of the fruit in the place of "farine lactée" in the feeding of infants, the pulp

being mixed with water or milk. Gautrelet analyzed the fruits, his results being as follows: The envelope and kernel make up about one-half of the fruit. The pulp contains glucose 11.44, sorbine 13.56, nitrogenous matter 6.85, cellulose 6.05, fat 0.50, carbonates, chlorides and phosphates of alkaline earths 3.41, water 8.00, the percentages being taken on the whole fruit.

Action of the pancreatic liquid on the decomposition of salol.—According to Nencki the antiseptic virtues of salol are due to the decomposition into phenol and salicylic acid. According to this author the pancreatic liquid plays the principal role in this reaction. Dr. Gley (*Soc. de biologie*, through *Rep. de Pharm.*, 1892, 230) experimented with dogs from which the pancreas had been taken. He found in the urine from such animals after exhibiting salol, salicylic acid. These results confirm the conclusions of Perrier and Patein who stated that the decomposition is due to alkalies which are found in the blood from wounds or in the intestinal track.

Adulteration of iodoform gauze.—In an article signed L. & D. (*Bull. commerc.*, 1892, 186) attention is called to a peculiar sophistication of iodoform gauze. The gauze examined was marked 30 per cent., but on analysis showed only 8 per cent.; the deficiency in color was made up with a nitro derivate of phenol. To look for this adulterant it suffices to treat the gauze with water when, if it be present, a yellow colored solution results, yielding on evaporation a golden yellow residue which, after being fused over charcoal, will not color ether and has lost its bitter taste. Properly prepared iodoform gauze should yield no coloring matter to water.

Fumarine in a papaveraceous plant.—Dr. Battandier (*Compt. rendus*, May 16, 1892) having studied for some time the extraction of glaucine from the leaves of *Glaucium luteum*, L., endeavored to obtain the same alkaloid from *G. corniculatum*, L., var. *phænicum*. He did not find glaucine, but papaverine. This latter alkaloid was characterized, (1) by the violet color produced by cold monohydrated sulphuric acid, which oxidizing agents change to brown, heat to grayish green, and which is destroyed by water; (2) by the chloroplatinate crystallizing in octahedra, and (3) by its behavior towards solvents. The alkaloids of *Hyppocum*, *Bocconia frutescens* and *Eschscholtzia californica* give with sulphuric acid a color similar to that of papaverine, but the chloroplatinates could not be crystallized.

Fumarine seems to exist in the genera and sub-genera *Fumaria*, *Platycapnos*, *Sarcocapnos*, *Ceratocapnos*, *Corydalis* and *Diclytra*.

Resin oil in linseed oil.—Dr. Coreil (*Journ. de Pharm. et de Chim.* Febr. 15, 1892) after reviewing the qualitative tests for resin oil in linseed oil proposes a quantitative test based on saponification with alcoholic potassium hydrate solution. The qualitative tests mentioned are, (1) the red and brown color produced by fuming bichloride of tin; (2) the non-saponification by alkalis; (3) odor and taste by which 5–10 per cent. of resin oil could be recognized; (4) the brown and black color produced by a current of chlorine. The quantitative test which, however, only comes near the truth, is as follows: 2 gm. of the oil are freed of air by heating to 105° C. for five or six hours, then heated on a water-bath with 40 cc. of a deminormal alcoholic solution of potassium hydrate, the remaining alkali being titrated with a deminormal solution of hydrochloric acid in the presence of phenolphthaleine. The number of cc. used to saturate the fatty acids of the oil is multiplied by 0.02805 and the product divided by 2 to obtain the quantity of potassium hydrate necessary to saponify 1 gm. of oil. The quantity of potassium hydrate used to saponify 1 gm. of linseed oil varies between 201–221 mg. (average 211), for resin oil 21–41 mg. (average 31). The final calculation is based on the fraction,

$$\frac{100 (211 - n)}{211 - 31}$$

n representing the quantity of potassium hydrate necessary to saponify 1 gm. of the oil.

Blood oranges.—A. Barillé, in the meeting of May 4th of the Société de Pharmacie de Paris (*Rep. de Pharm.*, 1892, 277), calls attention to a sophistication of blood oranges. The zest of the samples examined was artificially colored with Biebrich scarlet or rocceline, two azo colors which, however, are non-poisonous.

Lead in commercial tartaric and citric acids.—Dr. Buchet (*L'Union pharm.*, 1892, 203) found in one kilogramme of commercial tartaric acid from 0.011–0.071 gm. of metallic lead, and from 0.017–0.363 gm. of lead salts. The method of analysis used is as follows: 200 gm. of tartaric acid are dissolved in three times their weight of distilled water with a slight excess of ammonia to insure the solution of sulphate of lead. The solution is

then set aside for twenty-four hours, the liquid decanted and the residue collected on a small filter. The filter and contents are treated with nitric acid; to this solution sulphuric acid and twice its volume of alcohol are added. The precipitate of sulphate of lead is washed with alcohol, collected on a filter and weighed after calcination. This gives the quantity of metallic lead. To estimate the amount in combination the ammoniacal liquid from above is used. The liquid is slightly acidulated with hydrochloric acid and a current of hydrogen sulphide passed through it. It is then set aside for twelve hours, the sulphide collected and this dissolved in dilute nitric acid. The remainder of the operation is the same as above.

Estimation of tannin.—G. Fleury (*Journ. Phar. Chim.*, 1892, 499) proposes to use egg albumen for estimating tannin. The hard boiled egg albumen is dried at a moderate temperature and powdered. This is washed with dilute alcohol (10 per cent.), very slightly acidulated with tartaric acid to saturate the alkali. The albumen is again dried and kept in a well-stoppered bottle. The method of operation is as follows:

Albumen powder equal to seven or eight times the quantity of tannin which is supposed to be present is added to the liquid in a flat dish. The dish is then set aside for forty-eight hours, stirring occasionally; the liquid must during this time be acid and not alkaline. The end of the reaction is attained when the liquid does not give a color with perchloride of iron. The powder is then collected on a filter, is washed with a very dilute alcohol, and is then dried at 100° C. At the same time the amount of water in a sample of the albumen from the stock is determined, the difference between the two then giving the amount of tannin present. Gallotannic acid cannot be estimated according to this process, because the absorption by the albumen is incomplete and very slow. In testing it is necessary to bear in mind that gallic acid is not absorbed by the albumen and consequently still gives its reaction with ferric chloride.

Dental and buccal antiseptis.—Dr. Millon (*Monit. therap.*, through *Journ. Pharm. Chim.*, 1892, 624) prescribes the following mouth-wash for the above purpose, a tablespoonful to be used with a tumbler of lukewarm water: Thymic acid (thymol), 0.25; benzoic acid, 3.00; tincture of eucalyptus, 15.0; alcohol, 100.00; oil of pepper-mint, 0.50 gm.

Marine glue, according to *Moniteur industriel* (*Nouv. Remède.*, April, 8, '92, iv) is prepared as follows: About 450 gm. of caoutchouc are dissolved in 18 litres of benzol. When solution has taken place and the mixture assumed the consistency of a thick cream, which it usually does after about 10 days, shellac is added equal to two or three times the weight of the solution. The mixture is heated and run into plates. The glue is used at a temperature of 120° C.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

Iodine-absorption of oils and fats.—The method given in detail in the American Journal of Pharmacy, 1892, page 79, in which it was recommended to use four times as much iodine as was likely to be absorbed, has been modified, further research establishing that twice the amount of iodine was sufficient. The modified method answering for all fats and oils is as follows: About 0.150 gm. are dissolved in 10 cc. chloroform, 10 cc. each of iodine and mercuric chloride solutions are added and allowed to stand two hours; after adding 20 cc. potassium iodide solution and 100–150 cc. water, the excess of iodine is titrated with sodium thiosulphate solution. If in the determination it be found that the blank test requires less than twice the quantity of thiosulphate solution used in the case of the oil or fat, the determinations must be repeated, using 20 cc. each of iodine and mercuric chloride solution for 0.150 gm. oil or fat. — D. W. Fahrion, *Chemiker Ztg.*, 1892, 862.

To determine alkalinity of Labarraque's Solution, etc.—N. G. Blattner proposes several methods: (1) 25 cc. are diluted with 50–100 cc. water and after adding water of ammonia in excess the mixture is gradually heated until the reaction has ceased, when the liquid can be boiled to dryness and redissolved in water to make 250 cc. Of this solution, 100 cc. (= 10 cc. original preparation) can be directly titrated with standard sulphuric or hydrochloric acid, using methyl-orange as indicator. By using methyl-orange and phenolphthaleine it is possible to determine separately the alkalinity due to sodium hydrate and sodium carbonate. (2) 10 cc. of the preparation are diluted with water, a few drops phenolphthaleine added and titrated with normal sulphuric acid; it may be necessary to add a drop of phenolphthaleine solution from time to time to determine if the alkali has been neu-

tralized as the first portion may be decolorized through the liberation of small quantities of chlorine before the alkali has been neutralized. (3) 25 cc. are diluted with water and a little cobalt or nickel sesquioxide suspended in water added; after gradual heating (to prevent a violet reaction) the mixture is boiled, diluted with water to 250 cc., filtered, and in 100 cc. (10 cc. original solution) the sodium hydrate and carbonate are determined as under the first method. All three methods give satisfactory results; No 2 after some practice is to be preferred owing to rapidity.—*Chemiker Ztg.*, 1892, 885.

Syrup of ferrous iodide, according to A. Bernick, is a delicate reagent for ammonia, the color being changed to yellow or brown; this color is destroyed by boiling or by the addition of citric acid. It is thought that this is the explanation of the change in color that the syrup sometimes shows; at the same time the remedy suggests itself, either to boil such a syrup, or to add a little citric acid.—*Pharm. Ztg.*, 1892, 373.

Constituents of insect powder.—In continuing their investigations, Schlagdenhauffen and Reeb obtained, by distilling Dalmatian insect powder with steam, a pale yellow oil of a chamomile-like odor, in which is suspended a small quantity of a crystalline substance. The aqueous distillate contains formic, acetic and propionic acids and another organic acid, which was found to be poisonous, called *chrysanthemic acid*; the sodium salt of this acid is insoluble in alcohol. The residue from the distillation was found to still have toxic properties; by extracting this residue with petroleum ether, evaporating, dissolving in alcohol, neutralizing with potassa, evaporating to dryness, taking up with water, filtering, acidifying filtrate with tartaric acid, extracting with ether and evaporating the ethereal solution another poisonous acid, *pyrethrotoxic acid*, was obtained as a yellow, uncrystallizable, buttery mass, which was found very easily soluble in alcohol, chloroform, benzin, benzol, acetic ether and acetone. Caucasian insect powder yields almost identical results.—*Chem. Centr.-Blatt; Pharm. Ztg.*, 1892, 374.

Iodoform decolorizer.—Apparatus in which iodoform preparations have been made can be freed from every trace of the odor by the addition of a few drops of laurel oil before cleaning the apparatus with saw-dust. The odor of the laurel oil disappears in a very short time.—F. K., *Pharm. Ztg.*, 1892, 396.

Russian peppermint oil has been chemically examined by G. Andres and A. Andreef; they find that 17 volume per cent. of the oil is made up of the hydrocarbons lævo-limonene, menthene and pinene; the lowest-boiling fraction gave indications of a naphthylene $C_{10}H_{18}$. Experiments were also made proving that the distillation of the fresh and the air-dried herb gave identical products. The chief constituents of the oil are menthol and menthone.—*Berichte ; Pharm. Ztg.*, 1892, 405.

Agathine, also called salicylaldehyde- α -methylphenylhydrazone, has been found to give good results in neuralgic and anti-rheumatic conditions in doses of 0.12–0.5 gm. (2–7 grains) two or three times daily: the action is not immediate but shows after a few days when 4–6 grams have been administered. The compound, when pure, forms small white laminæ melting at $72^{\circ} C$.; it is insoluble in water, but soluble in alcohol, ether, benzol, ligroin; boiling with concentrated hydrochloric acid decomposes it. The formula is given as $C_6H_4.OH.CH:N.N.CH_3.C_6H_5$; it is made by the Höchst Farbwerke.—(*D. Med. Ztg.*) *Pharm. Ztg.*, 1892, 414.

Diamond cement.—500.0 finest glue are allowed to soften and swell for several hours in 400.0 water and 100.0 acetic acid (96 per cent.); it is then warmed until dissolved and 1.0 pure carbolic acid added.

Universal cement.—250.0 sugar placed in a flask are dissolved in 750.0 water by aid of a water-bath, 65.0 slaked lime added and the mixture warmed for 3 days at 70 – $75^{\circ} C$., agitating repeatedly. After cooling, the supernatant liquid is poured off clear; 200.0 are diluted with 200.0 water and 550.0 finest glue allowed to swell in it for three hours, when it is heated until perfect solution takes place; after restoring the original weight by adding water, 50.0 acetic acid (96 per cent.) and 1.0 pure carbolic acid finish the preparation.

Syndetikon.—In 400.0 of the sugar-lime solution (see above) 600.0 ground glue are allowed to soften for three hours; after heating to effect solution and replacing the evaporated waste, the cement is neutralized with oxalic acid (about 30.0) and 1.0 carbolic acid added.—E. Dieterich, *Pharm. Ztg.*, 1892, 154.

Cement for porcelain.—20.0 white lead and 12.0 pipe clay, carefully dried, are incorporated with 10.0 boiled linseed oil heated on a water-bath; the cemented articles are dried slowly in a warm place.—(*Industrie-Bl.*) *Pharm. Centralhalle*, 1892, 330.

Citric acid may crystallize with or without water of crystallization; the anhydrous acid will crystallize again from cold aqueous solutions in the anhydrous form. By heating aqueous solutions of the hydrated acid to 130° C., the anhydrous acid is obtained; this melts at 153° C. If a crystal of the hydrated acid be placed in a cold saturated solution of the anhydrous acid, there will crystallize from the solution the hydrated acid, the reverse of this, however, has never been accomplished. It has been found that corresponding to the two modifications of the acid there can be prepared the corresponding lead salts. An error which has been introduced in many text books [U. S. P. also contains it—F. X. M.] gives the melting point of the hydrated acid at 100° C.; at $70-75^{\circ}$ C. the hydrated citric acid sinters together, due to loss of water of crystallization; further heating produces little change until a temperature of $135-152$ per cent. is attained, when it melts; the wide range $135-152^{\circ}$ C. depends upon the rapidity of heating.—H. Witter, (*Berichte*) *Pharm. Centralhalle*, 1892, 353.

Ash of kamala.—In a sample recently received from J. H. Maiden which was collected in the northeastern portion of New South Wales, Professor Flückiger found only 3.35 per cent. ash. Climatic conditions apparently do not cause an increase in the amount of ash, as samples from northwestern India, central India, Java and New South Wales contained about three per cent. or less.—*Archiv der Pharm.*, 1892, 249.

CONSTITUENTS OF ANGOSTURA BARK.¹

BY H. BECKURTS AND P. NEHRING.

The bark of the Columbian rutacea, *Cusparia trifoliata*, Engler (*Galipea officinalis*, Hancock), has been examined by the authors.

30 kilos of the coarsely-powdered bark was extracted with 75 kilos of ether; most of the ether was then distilled off, and the brown residue extracted with dilute sulphuric acid. Wax and essential oils were thus separated from the alkaloids, and, in addition a greenish-yellow, crystalline substance was precipitated; it is the salt of a base or bases, but it could not be obtained pure.

From the acid solution, four alkaloids, *cusparine*, *cusparidine*, *galipine* and *galipidine* were separated. The separation of these

¹ *Arch. Pharm.*, 229, 591-617; *Jour. Chem. Soc.*, 1892, 642.

was, however, exceptionally difficult, since their solubilities are very similar, and they were obtained pure only by means of (1) repeated fractional crystallization from their solutions in light petroleum; (2) fractional crystallization of the respective sulphates from hot aqueous solution.

The residual bark, after extraction with ether, was extracted with 60 kilos of alcohol, and the alkaloids, wax and oils separated from each other as from the ether extract. The same four alkaloids were again obtained. The total quantity of impure bases which was thus separated amounted to 595 grams, or 2.0 per cent.

Galipine, $C_{20}H_{21}NO_3$, crystallizes from light petroleum in slender, lustrous, soft needles which are pure white. It melts at 115.5° . It dissolves very readily in alcohol, chloroform, acetone, benzene and ether, but is only sparingly soluble in light petroleum. Its salts are yellow, and crystallize like the base. The *hydrochloride*, $C_{20}H_{21}NO_3 \cdot HCl \cdot 4H_2O$, forms lustrous, yellow plates, very soluble in warm water. The *hydrobromide*, $C_{20}H_{21}NO_3 \cdot HBr$, crystallizes in deep yellow needles, and is very soluble in water and alcohol. The *hydrogen sulphate*, $C_{20}H_{21}NO_3 \cdot H_2SO_4$, forms lustrous, yellow needles. The *platinochloride*, $(C_{10}H_{21}NO_3)_2 \cdot H_2PtCl_6$, melts at $174-175^\circ$, crystallizes in very small, yellow needles, and is almost insoluble in alcohol and in water. The *aurochloride*, $C_{20}H_{21}NO_3 \cdot HAuCl_4$, melts at $175-176^\circ$, and crystallizes in very small brownish-red needles. The *methiodide*, $C_{20}H_{21}NO_3 \cdot MeI$, forms small, lemon-yellow needles which melt at 146° ; it is soluble in alcohol and in hot water, insoluble in ether.

Galipidine, $C_{19}H_{19}NO_3$, crystallizes from light petroleum in very light, silky, lustrous plates which are pure white. It is readily soluble in alcohol, ether, benzene, ethyl acetate, and chloroform, less soluble in light petroleum; it melts at 111° . The salts are pale yellow, are readily soluble in hot water, and the solutions have a bitter taste. The *hydrochloride*, $C_{19}H_{19}NO_3 \cdot HCl + 3H_2O$, forms pale yellow needles, soluble in warm water, but only sparingly soluble in cold water; the *hydrobromide*, $C_{19}H_{19}NO_3 \cdot HBr$, crystallizes in minute, pale-yellow needles, readily soluble in water and alcohol; the *aurochloride*, $C_{19}H_{19}NO_3 \cdot HAuCl_4$, is precipitated as a mass of minute, chocolate-brown needles; it melts at 167° , and is almost insoluble in water and alcohol; the *platinochloride*, $(C_{19}H_{19}NO_3)_2 \cdot H_2PtCl_6$, separates as a voluminous, yellow, crystalline precipitate,

very sparingly soluble in water; it melts at 182° . The *methiodide*, $C_{19}H_{19}NO_3 \cdot MeI$, forms a fine, yellow, crystalline powder, readily soluble in hot water and alcohol; it melts at 142° , and has an intensely bitter taste.

Cusparine, $C_{20}H_{19}NO_3$ is comparatively easily separated from the other bases, owing to the sparing solubility of its salts. It melts at 89° , and is readily soluble in alcohol, ether, chloroform, acetone and benzene, more sparingly in light petroleum. Its salts are white and sparingly soluble in water, more readily in alcohol. The *hydrochloride*, $C_{20}H_{19}NO_3 \cdot HCl + 3H_2O$, crystallizes in long, white needles, very slightly soluble in water, readily in alcohol, and of a bitter taste; the *hydrobromide*, $C_{20}H_{19}NO_3 \cdot HBr$, forms long, pale-yellow needles, of bitter taste; it is very sparingly soluble in water; the *sulphate*, $(C_{20}H_{19}NO_3)_2 \cdot H_2SO_4 + 7H_2O$, crystallizes in white prisms of a bitter taste; it is only sparingly soluble in water, more readily in alcohol; the *aurochloride*, $C_{20}H_{19}NO_3 \cdot HAuCl_4$, forms a light-brown, voluminous mass of minute crystals, melts at 165° , and it is almost insoluble in water; the *platinochloride*, $(C_{20}H_{19}NO_3)_2 \cdot H_2PtCl_6$, forms minute, yellow needles, which may be recrystallized from hot water. It melts at 179° . The *methiodide*, $C_{20}H_{19}NO_3 \cdot MeI$, forms lustrous, yellow needles, of intensely bitter taste, melting at 186° .

Cusparidine, $C_{19}H_{17}NO_3$, crystallizes from light petroleum in minute, slender, white needles. It melts at 78° , and dissolves readily in chloroform, alcohol, ether, and ethyl acetate, less readily in light petroleum. The salts are white and of bitter taste; they are less soluble than those of galipine and galipidine, but more readily than those of cusparine. The *hydrochloride*, $C_{19}H_{17}NO_3 \cdot HCl + 3H_2O$, is precipitated as a white, voluminous mass of crystals, which melt very readily; it is sparingly soluble in water, more readily in alcohol, and has a bitter taste; the *hydrobromide*, $C_{19}H_{17}NO_3 \cdot HBr$, crystallizes from water in well-formed prisms, which are anhydrous; it is sparingly soluble in hot water, almost insoluble in cold water, more readily soluble in alcohol. The *sulphate*, $(C_{19}H_{17}NO_3)_2 \cdot H_2SO_4 + 3H_2O$, separates as a crystalline precipitate when cusparidine is exactly neutralized with sulphuric acid; it is moderately soluble in water, still more readily in alcohol, and has a very bitter taste. The *aurochloride*, $C_{19}H_{17}NO_3 \cdot HAuCl_4$, separates as a voluminous, brown mass of minute crystals; it is anhydrous, and melts at 167° . The *platinochloride*, $(C_{19}H_{17}NO_3)_2 \cdot H_2PtCl_6$, forms a pale-yellow, crystal-

line precipitate, which is insoluble in water and alcohol; it melts at 182° . The *methiodide*, $C_{19}H_{17}NO_3MeI$, is prepared by heating cusparidine with excess of methyl iodide for three hours at 100° in a sealed tube; after recrystallizing from water, it forms a pale-yellow, crystalline powder, soluble in water and alcohol, insoluble in ether. It has a very bitter taste; its color changes to brown on exposure to the air or light, and it melts at 149° .

The four alkaloids are tertiary bases; their reactions with the various alkaloidal reagents are described.

The *essential oil* of angostura bark, which was extracted by means of ether, was freed from alkaloids by dilute sulphuric acid, and then remained as a dark-colored liquid. From 100 kilos of the bark, 1.5 kilos of oil was obtained. It has an aromatic odor; the sp. gr. at 15° is 0.956, and it dissolves in ether, alcohol, chloroform, light petroleum, and glacial acetic acid; it reddens litmus. It is free from sulphur and nitrogen, and does not react either as a phenol, a ketone, or an aldehyde. Distilled under a pressure of 35 mm., it commences to boil at 153° ; the greater part distilled between 200° and 220° ; the last portions became solid when cooled with a mixture of sodium sulphate and hydrochloric acid.

The *bitter principle angosturin*, is insoluble in ether, but soluble in alcohol, and is found therefore in the alcoholic extract of the bark; it is obtained free from alkaloids after the alcoholic extract has been rendered alkaline with sodium carbonate and extracted with ether. The bitter principle is difficult to obtain pure. The residue, after separating the alkaloids, was dissolved in water, and an excess of tannin added; the precipitate was washed with water, and dissolved in alcohol; lead acetate was added, and the precipitate first washed with alcohol and then with boiling water. The angosturin was further purified by dissolving it in water, precipitating with charcoal, extracting with alcohol and finally evaporating the latter. It remained as a transparent, pale-yellow mass, which is soluble in water, alcohol, and glacial acetic acid. The addition of ether to the solution in acetic acid precipitated the angosturin quite white; it melts at 58° .

The angostura bark contains a *glucoside*, which may be separated from the bark, after, exhausting it first with ether, and then with alcohol, by extraction with water. The solution fluoresces and reduces Fehling's and other metallic solutions. The glucoside was not, however, obtained pure.

REACTIONS OF HYDRASTINE AND OTHER
ALKALOIDS.¹

BY D. VITALLI.

If a small crystal of hydrastine, or of one of its salts, is placed on a porcelain capsule and covered with concentrated sulphuric acid (0.5–1 cc.), it turns yellow, and, on stirring, the liquid acquires the same color; on adding a small fragment of nitre (an excess must be avoided), the color changes to a more or less intense brownish-yellow; if a solution of stannous chloride is now added drop by drop, the solution acquires a magnificent reddish violet color, the intensity of which depends on the amount of alkaloid present. This coloration is not destroyed on dilution with water.

If a particle of hydrastine is treated with nitric acid (4 to 6 drops), the alkaloid turns yellow, on heating for an instant to the boiling point, nitrous fumes are evolved, and, on evaporating to dryness at a gentle heat, a yellowish residue is left, which, when cold, is colored brownish-yellow by alcoholic potash, and remains as a greenish-brown mass on evaporating the alcohol. When cold, this becomes deep-violet on treatment with sulphuric acid. Solutions of hydrastine must be evaporated to dryness before applying the tests, which are sufficiently delicate to detect 0.0001 gram of the alkaloid.

Bebeerine turns blood-red on treatment as described with concentrated sulphuric acid and nitre, the color changing to green on the addition of stannous chloride.

Codeine turns dark brick-red when alcoholic potash is added to its solution after treatment with nitric acid, and coffee-colored when further treated with sulphuric acid; similarly, *narcotine* acquires an orange color on the addition of potash, the color changing to violet-red on adding sulphuric acid, and red to yellow on diluting with water.

A rather less delicate test for hydrastine is as follows: A particle of the solid alkaloid is fused with five or six times its weight of caustic potash, the melt allowed to cool, acidified with hydrochloric acid, extracted with chloroform, the extract evaporated to dryness on the water-bath, and the residue treated with a very dilute solution of ferric chloride; a fine, blue coloration is obtained if a few milligrams of the alkaloid has been employed; the color is destroyed by acids, and changed to brownish-red by alkalis.

¹ *L'Orosi*, **14**, 405–416; *Jour. Chem. Soc.*, June, 1892, 755.

A characteristic reaction for *aconitine* is obtained by adding to it in small quantities a solution of potassium permanganate in sulphuric acid (1 : 200) and stirring; the green color of the reagent is replaced by a violet-tint, which disappears on further agitation, and is restored on adding more of the reagent, and so on. A point is ultimately reached at which the color is not affected by agitation, but at once disappears on diluting with water.

Clear indications of the presence of hydrastine in putrid animal matter cannot be obtained if the latter is treated by the Stas-Otto method, on account of the ptomaines and other impurities contained in the extract.

Hydrastine is, however, extracted from alkaline, but not from acid, solutions by light petroleum, and, by taking advantage of this fact, and substituting baryta for sodium carbonate, and light petroleum for ether, in the extraction, it is possible to isolate the alkaloid in a state of sufficient purity. The author recommends the use of light petroleum in place of chloroform, ether, or amyl alcohol in the extraction of alkaloids from urine and animal remains, as they are nearly all soluble in that menstruum (the exceptions are morphine, curarine, and pilocarpine) whilst ptomaines, leucomaines, pigments, and extractive matters are insoluble.

DIGITALIN.¹

BY H. KILIANI.

Hitherto the numerous attempts to obtain the pharmacologically important constituents of *Digitalis purpurea* in a state of chemical purity and in a crystalline condition have been without any practical result. Nativelle² believed that he had been successful in attaining that object, and for some time a preparation, made according to his directions, was used, especially in France; but it was afterwards given up, since it proved to be irregular in its action and indeed even hurtful. The "digitaline crystallise" of Nativelle was not a homogeneous substance, and in that respect it resembled all the other substances which have been introduced into commerce under the same or similar names. The recognition of this fact is

¹ *Archiv der Pharm.*, 230, p. 250; reprinted from *Phar. Jour. and Trans.* June 25, 1892, p. 1061.

² *Journ. de Pharm.*, iv, 9, 253; 16, 430; 20, 87.

most of all due to the meritorious investigations of Schmiedeberg,¹ the principal results of which are as follows :

The leaves and seed of *Digitalis purpurea* contain a preponderating amount of an inactive glucoside resembling saponin and named digitonin. They also contain three other substances which possess the characteristic power of acting upon the heart—crystallizable digitoxin and the two amorphous glucosides, digitalin and digitalein. Among these digitoxin does not appear to be suitable for therapeutic purposes, partly because great irregularity in its absorption is to be apprehended on account of its complete insolubility in water, and more especially because the investigations of Koppe² have shown that it also gives rise to very unpleasant and even dangerous effects. On the other hand digitalin and digitalein would be very suitable for practical use in medicine if it were possible to obtain them in a state of purity.

Several years ago I commenced a further investigation of the constituents of digitalis, and to some extent the results arrived at have been published.³ Digitonin was obtained in crystalline condition, its composition was ascertained, the products of its transformation investigated, and it was further proved that the article then met with in commerce under the name of crystallized digitalin was nothing more than nearly pure digitonin, or in other words, a substance perfectly worthless in regard to action upon the heart, while in other respects directly injurious, as will be shown at the end of this communication.

I am now in a position to state that the solution of the main problem has been achieved, namely, the discovery of a practically applicable method of preparing the really active principle of digitalis in a state of purity. For this satisfactory result I am essentially indebted to the friendly assistance of Professor Boehm, of Leipzig, in carrying out the pharmacological testing of a large number of my products, by which I was led to the right path in my inquiries.

The conclusions thus arrived at were as follows:

(1) Besides digitonin and the active substances, the different kinds of commercial digitalin hitherto known generally contain two perfectly amorphous glucosides.

¹ *Arch. f. Exper. Pathol.*, 3, 16.

² *Arch. Exper. Pathol.*, 3, 274.

³ *Ber. d. deutsch. Chem. Ges.*, xxiii, 1555; xxiv, 339, 3951.

(2) The digitalein of Schmiedeberg is certainly also a mixture; its action upon the heart is perhaps due to the presence of a glucoside that has not yet been separated in a state of purity, or perhaps it may be due to some admixture of digitalin.

(3) On the contrary, the digitalin of Schmiedeberg is a distinctly individual substance which possesses, in a marked degree, the characteristic property of acting upon the heart.

This substance is now being made according to my directions by Messrs. Boehringer, and it is to be obtained as a medicinal agent under the name of *Digitalin verum*. Unfortunately, this substance cannot be brought into an actually crystalline condition. For that reason it appears to be the more appropriate that its characters should be minutely defined, and that satisfactory evidence of its chemical individuality should be given.

Digitalin has the form of a white amorphous powder, the particles of which swell up when immersed in water. It is soluble in about one thousand parts of water, and in about one hundred parts of fifty per cent. alcohol. The water solution froths on being shaken, and it is remarkably prone to become mouldy. Digitalin is dissolved in considerable amount by hot absolute alcohol or spirit of 80 or 90 per cent., and when a minimum of solvent is used, the solution on cooling becomes almost solid from the separation of a thick magma of granules, which, as observed by Schmiedeberg, appears to the naked eye as if it were a case of crystallization. Examination by the aid of the microscope, however, shows that the mass consists of granules which, though of very uniform size, are entirely destitute of structure.

The uniformity of this deposit is, however, in itself a very characteristic feature of the substance; it is, moreover, an excellent criterion of its purity. When digitalin contains only a small percentage amount of the glucosides associated with it in digitalis, it is impossible to effect its separation from solution in the form above described. When it also contains some digitonin, and 85 per cent. alcohol is used for dissolving it, crystals will be found among the granules deposited from the solution after cooling.

These impurities of digitalin may be detected with greater accuracy by means of the following tests:

(1) A few granules when mixed with about 2 cc. of caustic potash solution (1 : 10) should retain their whiteness for at least one

minute. The presence of the minutest admixture of the amorphous glucosides is at once revealed by the rapid appearance of an intense yellow coloration.

(2) When digitalin is made into a thin paste with water, and there is added for every 100 parts of water, 22 parts amylic alcohol, on leaving the mixture for twenty-four hours in a closed flask, distinct crystalline warts will be apparent if digitonin be present even in very minute proportion.

Digitalin is almost insoluble in chloroform or ether; when the moderately dilute solution in absolute alcohol is gradually mixed with small quantities of ether the liquid suddenly becomes turbid, and within a short time there is a copious deposition of digitalin granules. On pouring off the solution and adding to it more ether a second point of saturation is reached, and with it a further deposition. The same effect may be produced a third time or more, and this behavior is evidence of the purity of the substance.

Contrary to previous statements the taste of digitalin is but slightly bitter; the intense bitterness and very disagreeable taste previously ascribed to digitalin are characters belonging to the amorphous glucosides with which it is associated in digitalis.

Digitalin dissolves in concentrated hydrochloric or sulphuric acid with a golden yellow color, and in the latter case the color rapidly passes into blood red. On adding to the solution, while still yellow, a drop of nitric acid, ferric chloride, or bromine water, a brilliant purple like that of digitalis flowers is produced, but the color is very evanescent. This coloration is obtained with more certainty, and so as to be permanent for one or two hours, when a very small quantity of digitalin is dissolved in ordinary sulphuric acid without any addition. Probably the small quantity of nitric acid commonly present in oil of vitriol is just sufficient to produce the coloration, but not sufficient for causing the further change which appears to take place by reason of the presence of an excess as compared with the digitalin when a drop of the oxidizing agents is added.

Digitalin remains white when heated to 200° ; at 210° it begins to aggregate, and towards 217° it melts, becoming yellow-colored.

Analysis gave results agreeing with those obtained by Schmiedeberg which lead to the formula ($C_5H_8O_2$). This agreement may be taken as strong evidence that Schmiedeberg's digitalin was a chemi-

ally individual substance. However, the best support of this view is furnished by the behavior of digitalin with dilute hydrochloric acid. The substance is thus split up very definitely into digitaligenin, glucose and digitalose. When pure digitalin is used the first named product separates at once in fine crystals, but when the material operated upon contains some of the other glucosides, the digitaligenin cannot be made to crystallize at all, or only by very tedious operations.

In Schmiedeberg's experiments on the splitting up of digitalin with watery hydrochloric acid he obtained besides a glucose an insoluble resinous substance—digitaliresin—which he was able to decompose again into sugar and a second resin. On repeating this experiment it becomes at once obvious that this digitaliresin cannot possibly be a chemically individual substance, for it begins to be deposited from the first moment that heat is applied, and it may easily be seen that the resin carries down with it unaltered granules of digitalin. When the application of heat is continued for the purpose of decomposing the digitalin thus mechanically carried down, the acid causes a further decomposition at the surface of the resin, while inside the mass there still remains unaltered digitalin and digitaliresin. In order, therefore, to effect a definite splitting up, care must be taken that nothing is deposited while heating with the acid, and this may be done in the following way:

The digitalin is first mixed with 8 parts of 50 per cent. alcohol, 2 parts concentrated hydrochloric acid (1.19) added, shaken together, and heated for half-an-hour in a boiling water-bath under a reflux condenser. The liquid, clear at first rapidly becomes dark-colored, but does not during the heating deposit more than mere traces of resinous substance. Upon cooling, after removal from the water-bath, there is an abundant formation of brilliant acicular crystals of digitaligenin aggregated in warty masses. The crystallization takes place more readily on rubbing the sides of the glass, or on dropping in a crystal of the substance. On separating the crystals, washing with 50 per cent. alcohol, and drying, the quantity thus obtained amounts regularly to 30 per cent. of the digitalin operated upon. When the filtrate is mixed with an equal volume of water, repeatedly shaken with ether, and the ether shaken with very dilute soda solution to remove hydrochloric acid, a further quantity of the same substance is to be obtained. By repeated crystallization from the

least possible proportion of 93 per cent. alcohol, digitaligenin may be obtained in colorless crystals.

Digitaligenin is insoluble in water, sparingly soluble in ether free from alcohol, and readily soluble in alcohol, especially on heating. It dissolves in sulphuric acid or ordinary oil of vitriol with the same coloration as digitalin. The dry crystals of the pure substance become highly electric when rubbed. They melt at $210-212^{\circ}$. Analysis gave results leading to the formula $C_{16}H_{22}O_2$, and from the composition of several derivatives it appears very probable that this is a correct formula.

Professor Boehm informs me that when applied to frogs, digitaligenin has no action. For the purpose of identifying the remaining products of the transformation, the watery liquid which had been extracted with ether was again shaken with chloroform to remove a small quantity of resinous substance, then warmed to drive off chloroform and ether, and after cooling treated with silver oxide to separate hydrochloric acid. The liquid was then evaporated to a syrupy consistence, and left for some months to crystallize, partly alone and partly with addition of suitable solvents; but up to the present there have been no signs of crystallization, a circumstance which seems very remarkable when the further results of the investigation are considered.

An attempt was then made to obtain a knowledge of the nature of the sugar by preparing an osazone. Without much difficulty a product was obtained which crystallized very well, and was apparently an individual osazone melting at 206° C.; but the analysis of this substance obtained in different operations gave results which were but little in accord, and did not correspond with any known member of the class of compounds. Consequently, the presence of a mixture of sugars was to be suspected, and for their examination the method of oxidation by means of bromine proved very serviceable. From one of the two acids produced a lactone was obtained which crystallized well, and from the other a readily crystallizable barium salt.

The thick syrup was mixed with 2 parts of bromine after dilution with 5 parts of water, and by means of constant shaking the bromine was absorbed rapidly. After driving off the dissolved bromine and removing the hydrobromic acid by silver oxide, the liquid was evaporated to a syrupy consistence. Within some

hours crystals were formed abundantly (A); these were separated by a suction pump, and when washed with a few drops of water were nearly colorless. The mother liquor was diluted and boiled with barium carbonate, the filtrate carefully saturated with alcohol, and left for some time in a closed flask, the sides of which were frequently rubbed. After some days warty crystals (B) were formed, which were separated from the mother liquor by washing with 50 per cent. alcohol and pressing. After separating the barium from the mother liquor by sulphuric acid and evaporating, a second crystallization of the substance A was obtained, and when the mother liquor from it was again converted into barium salt as before, a further quantity of the substance B was obtained. By this somewhat troublesome but certain method it was possible to separate the two acids produced by the action of bromine.

On recrystallizing the substance A, it was obtained in fine colorless crystals, readily soluble in water or alcohol, sparingly in ether; the crystals had a neutral reaction, and consisted of the lactone of a new acid, digitalonic acid. The air dry substance does not lose water in a vacuum over sulphuric acid; a little above 130° C. it begins to aggregate, and it melts at $138-139^{\circ}$ C. Analysis gave results leading to the formula $C_7H_{12}O_5$. On heating with potash or soda solution, salts of the acid are obtained which do not crystallize. Moderately dilute solutions of these salts mixed with silver nitrate give in a short time an abundant deposit of silver digitalonate in microscopic needles, $C_7H_{13}O_6Ag$. When this salt is heated a product sublimes in fine needles.

From what has been stated it would appear that in the splitting up of digitalin the sugar produced, digitalose,¹ which has the composition $C_7H_{14}O_5$, and according to its behavior with bromine, it contains an aldehydradicle. In its composition it is closely related to rhamnose, and for that reason it ought to possess a great capability of crystallizing. Further investigation must determine what may be the explanation of the contrary character which has been described.

The barium salt B obtained from the mother liquor of the lactone was also readily purified by recrystallization; it then formed sharply defined laminæ having the appearance and composition of barium

¹ This name has been applied by Homolle and Quevenne (*Mem. sur la digitaline*) not to a chemically individual substance, but to a mixture of glucosides and their product of decomposition.

gluconate $(C_6H_{11}O_7)_2Ba - 3H_2O$.¹ A calcium salt prepared from it, corresponded in all respects with ordinary calcium gluconate. The lactone prepared according to the directions of E. Fischer² from the calcium salts gave the dextro rotation corresponding to d-gluconic acid, and hence it may be inferred that in the transformation of digitalin grape sugar is produced.

On the basis of the assumption, already referred to as being probably correct, that the composition of digitaligenin is represented by the formula $C_{16}H_{22}O_2$, the following equation is obtained: $C_{16}H_{22}O_2 + C_6H_{12}O_6 + C_7H_{14}O_5 - H_2O = C_{29}H_{46}O_{12}$, and a formula for digitalin $C_{29}H_{46}O_{12}$ which differs only by CH_2 from $C_{30}H_{48}O_{12} = 6 \times C_5H_8O_2$ or that indicated by the results of analysis of the glucoside. Whether that is really the correct expression of the molecular weight of the substance must be determined by other experiments.

However, it is sufficiently evident from the facts above stated that digitalin is to be regarded as having chemical individuality, notwithstanding the want of capability to crystallize. It follows that its physiological action must be constant, as distinguished from the varieties of commercial digitalin, hitherto known, which have been mixtures of the active and inactive constituents of digitalis, in variable proportions which rendered any safe adjustment of dose impracticable.

In the pharmacological trial of digitalin Professor Boehm has made the following observations:

Digitalin administered to frogs in doses of 0.5 milligramme produces systolic stoppage of the heart after 15 to 20 minutes. Increase in the volume of the heart pulse could not be detected by means of the Williams Dresser apparatus, even when the doses were very carefully administered.

Intravenous injection of 2 milligrammes produced in dogs increase of blood pressure with reduction of the frequency of the pulse and increase of its volume. By increasing the dose to 4 milligrammes

¹ The air-dry barium gluconate should theoretically lose 9.29 per cent. in drying, but the salt obtained gave only 8.17, and this was found to be the case also with barium gluconate (8.07). Herzfeld (*Annalen*, 220, 335) obtained similar results by heating barium gluconate to 115° C. By an error of calculation he gives as the theoretical amount of water 8.13 per cent.

² *Berichte*, xxiii, 2615.

arrhythmia was produced, and after a short time sudden stoppage of the heart.

The same effects were produced on the cat by 1 and 2 milligrammes, respectively.

Rabbits were found to be less sensitive. Subcutaneous injections of 5 to 8 milligrammes, respectively, produced no effect. By intravenous injection of doses up to 8 milligrammes neither the blood pressure nor the pulse frequency was sensibly affected. Gradual increase of dose to 15 milligrammes caused after some time sudden stoppage of the heart even in rabbits.

The first trials of the action of digitalin on the human subject were made by Dr. Mottes in Munich, and he obtained the best results with doses of 0.25 milligramme at intervals of from 2 to 3 hours, without the occurrence of any disagreeable or dangerous symptoms.¹

The use of pure digitalin in medical practice appears to recommend itself, not only in regard to the possibility of securing certainty in the dose. Hitherto it has been found that after long administration of digitalis preparations, hurtful and so-called cumulative effects have been observed, manifesting themselves especially in derangement of the stomach. This secondary action is in all probability to be ascribed not to digitalin itself, but to those substances which are associated with it in the digitalis preparations which have hitherto been used.

In any case this inference is warranted by the results which Professor Boehm has obtained in the investigation of digitonin. That substance, unfortunately, is the only one naturally associated with digitalin, except digitoxin, which has been up to the present time prepared in a state of absolute purity. It is also the one which occurs in the largest proportion. In regard to its action Professor Boehm reports as follows:

Digitonin exerts a very energetic action in the production of local inflammatory symptoms.

Administered internally to a dog in doses of 0.1 to 1.0 gramme, it produces in a short time vomiting, by which, of course, any further action upon the stomach or intestine is prevented. When given in doses of less than 0.1 gramme for ten days, it did not

¹ Professor von Ziemssen has also tried digitalin in the Munich hospital and obtained very good results.

appear to have any effect. But when injected subcutaneously, the dog refused to eat for two days, was very irritable, and would not suffer the injected places to be touched. At the end of the third day large pieces of skin were detached from the places injected, as if cut out with a knife down to the muscles of the back, and abscesses were formed, which rapidly healed.

In frogs, also, digitonin produces great local inflammation, in consequence of which these more sensitive animals rapidly succumb. In one instance marked nervous affection was noticed, with violent convulsions.¹

For the purpose of ascertaining whether pure digitalin would produce local irritation when administered in the dose requisite for therapeutic purposes, Professor Boehm instituted experiments with the same healthy dog which had suffered inflammatory effects from the injection of digitonin. The animal was subcutaneously injected with 3 milligrammes of digitalin, dissolved in 1 cc. of water, with a few drops of spirit. The dose was strong enough to produce a powerful effect, which lasted for nearly 24 hours; but at the place of injection there was not the slightest inflammation or other change to be detected. It may, therefore, be concluded that true digitalin does not produce inflammation when administered in the dose requisite for exerting its full general action, and, therefore, trial of subcutaneous injections will be admissible in the human subject.

Moreover, this experience justifies the assumption that the substances associated with digitalin and present in the preparations hitherto met with in commerce, as well as in the infusion and digitalis powder, contribute to the production of the so-called cumulative effects.

It must be admitted that digitalin has one essentially dark side in its want of crystallizability, and this I have endeavored in various ways to find a remedy for. The chief obstacle encountered was the fact that even slight chemical alteration of the substance completely destroys its activity. Thus, for instance, when digitalin is heated only for a few minutes with acetic anhydride a finely crystallizable product is obtained, the analysis of which shows that it has the

¹ This observation justifies the desire already expressed, that the name of "crystalline digitalin" should no longer be applied to a preparation consisting almost entirely of digitonin.—See *Berichte*, xxiv, 3953.

formula $C_{29}H_{44}O_{11}$, or that of a hydride of digitalin. Professor Boehm has made trial of it and found that it is entirely inert.

Note on the Preparation of Digitogenin.—The transformation of digitonin into digitogenin, dextrose, and galactose, by treatment with hydrochloric acid¹ takes place as already pointed out² in a comparatively definite manner. It is, however, subject to the disadvantage, especially when operating upon a large quantity, that the digitogenin separates in an amorphous condition, and is, therefore, very difficult to wash out and dry before it can be brought into a crystalline condition by means of chloroform or alcohol. There is also a possibility that the separated digitogenin may be contaminated either with portions of digitonin or with the first product of its transformation, digitoresin, either of which would thus escape complete decomposition.

The favorable results obtained in the transformation of digitalin in an alcoholic solution, therefore, induced me to make a trial of the same method with digitonin. The result was very satisfactory; but to ensure success strong alcohol must be used, and the heating must be continued for a long time. Experiments made by Sanda showed that the following is the best method of operating:

A mixture of digitonin ($C_{27}H_{46}O_{14} + 5H_2O$) with 8 parts of 93 per cent. alcohol, and 2 parts concentrated hydrochloric acid (1.19) is heated for an hour and a half in a boiling water-bath under a reflux condenser. The whole is then allowed to cool slowly, and gradually the whole liquid becomes filled with warty masses of digitogenin. This deposit is separated by a suction pump, washed with 80 per cent. alcohol and pressed dry. It amounts to from 23 to 27 per cent. of the glucoside operated upon. For conversion into digitogenic acid it requires no further purification. A further quantity may be obtained from the filtrate from this first crystallization. For that purpose the liquid is mixed with calcium carbonate until effervescence ceases, the greater part of the alcohol is then distilled off, the residue diluted with water and shaken out with chloroform. The chloroform solution is freed from water by sodium sulphate, chloroform distilled off, and the residue of impure digitogenin is crystallized from 93 per cent. alcohol. About 5 per

¹ *Berichte*, xxiii, 1555.

² *Berichte*, xxiv, 3951.

cent. more digitogenin is thus obtained, making the entire yield about 30 per cent., while theory requires 36.8 per cent. This difference is to be accounted for by the circumstance that the alcoholic mother liquors from the recrystallization of the impure digitogenin obtained from the chloroform solution contain also a resinous substance—Schmiedeberg's digitoresin—which would yield an additional quantity of digitogenin by further treatment with alcoholic hydrochloric acid, the transformation not having been completed in the first operation. It is interesting to note the fact that in this second transformation it is chiefly galactose that is produced. The dextrose appears to be more readily eliminated, and, therefore, to be separated first.

IMMUNITY AND CURE.¹

BY DR. KLEMPERER.

Behring and Kitasato were the first to prove that, in animals, diphtheria and tetanus could be cured by treatment with the blood serum of animals which had been rendered insusceptible to these two diseases. By later authors the same remarkable fact has been proved with regard to swine-erysipelas, and the disorder caused by the bacillus pyocyaneus.

Klempereer has succeeded in adding two more diseases to the list, namely, mouse septicæmia (described by Koch in 1878) and the pneumonia caused by Friedländer's bacillus.

White mice are exceedingly susceptible to the bacilli of mouse-septicæmia, whilst rabbits are much less susceptible. Mice, after the injection of the minutest quantity of the bouillon culture, die to a certainty in from two to three days. Rabbits, on the contrary, can stand a good few cubic centimetres of the fluid injected subcutaneously, and even more when the injection is intravenous, without showing any evident sign of disease. Still, in spite of this natural immunity, the blood serum of rabbits proved powerless to cure, or even clearly delay the progress of the disease in mice.

The rabbit, however, is not completely insusceptible to the bacilli of mouse-septicæmia. Inoculate a rabbit with the virus in the ear; an erysipelas-like inflammation extends over the ear to its root, and there stops, and the animal usually recovers. It is now insusceptible to further inoculation, the immunity holding good while the inocula-

¹ *Berl. klin. Woch.*, March 28; *The Medical Chronicle*, July, 1892.

tion is subcutaneous or intravenous. With the blood serum of these rabbits thus rendered insusceptible, Klemperer succeeded in curing septicæmia in mice.

In mice the course of the disease (septicæmia Koch) is characteristic. A mouse has an injection of 0.1 ccm. of the fresh bouillon-culture. Within 24 hours there are, as a rule, no signs of illness, but on the morning of the second day there is a great change. The creature sits cowered in a heap with its eyes plastered to. As the disease progresses it curls itself up more and more, and finally dies in this position in the course of the third day. By injecting 0.5-1.0 ccm. of the blood serum of a rabbit rendered insusceptible, Klemperer managed to avert the disease altogether, and this was the case whether the injection of the serum was 24 hours in advance or injected at the same time as the bacillus culture. But—and this is of more importance—a cure resulted in every case when the blood serum was introduced 24 hours after infection, and in three cases 48 hours after infection. In these last three cases the mice had already assumed the characteristic posture, and the control mice died in a few hours. The affected recovered but slowly after the serum injection, and it was some time before they became lively and lost their curved attitude.

The efficacy of this serum was tried on other germ diseases, but in every case the result was negative. It was found also that mice cured by the serum were proof against later infection by mouse septicæmia bacilli. How long the period of immunity may last Klemperer cannot, as yet, say. Injections on the eighth and fourteenth day were negative.

Klemperer repeated a similar set of experiments with Friedländer's pneumonia bacillus with precisely similar results.

He also experimented with the bacillus pyocyaneus, and with similar success. Here, also, as in the two other diseases, he found that the blood serum of an animal rendered insusceptible could *cure that one disease only*, being absolutely useless when employed against any other germ.

These are Klemperer's facts—we now come to his conclusions. In the wonderful *transmission of immunity* lies the kernel of the matter.

The blood serum does *not destroy* the bacillus, either the mouse septicæmia bacillus or Friedländer's. A few bacteria in 5 ccm.

serum developed freely, and when, after twenty-four to forty-eight hours, they were transplanted on to bouillon, they thrived and proved virulent.

When an animal recovers without artificial aid, this means that at length it has become insusceptible. The cure has resulted not from the dying out of the virus, but from the animal's becoming insusceptible to its action. On this theory the introduction of the immunized serum only hastens the process. The serum, however, of animals naturally insusceptible is powerless to avert or cure. There is, therefore, a difference between natural and artificial immunization. Still this difference may be only one of *degree*. Natural immunity is only relative. Immunity altogether is only relative, the natural being weak and the artificial strong, but still not absolute. The difference between the natural blood serum of an insusceptible animal and immunized serum may be only quantitative, as Kruse and Pansini have found that once when they injected 0.5 ccm. of the blood serum of a dog (naturally insusceptible to the pneumococcus) into two mice twenty-four hours before inoculation with the pneumococcus, they succeeded in producing immunity.

[These experiments are startling. When we have discovered what changes have taken place in immunized serum, wherein it differs, chemically or otherwise, from its former composition, then we may be able to cure disease without using the disease itself to produce its antidote. We seem to be on the brink of great discoveries.—W. A. STEWART.]

PROTEIDS OF MAIZE.¹

BY R. H. CHITTENDEN AND T. B. OSBORNE.

The proteid matter soluble in 10 per cent. aqueous sodium chloride, but insoluble in water, may be resolved by fractional heat coagulation into three distinct globulins, two of which have much in common with phytomyosin and phytovitellin, although they are not identical with those substances.

The globulin which gradually coagulates when the temperature of a sodium chloride solution of the proteids, prepared in the manner previously described, is slowly raised to 80°, contains rela-

¹ *Amer. Chem. J.*, **13**, 529-552, and **14**, 20-40; reprinted from *Jour. Chem. Soc.*, June, 1892, p. 746.

tively less nitrogen, the average percentage composition of several specimens made in this and other ways being: C, 52.70; H, 7.02; N, 16.74; S, 1.30; the nitrogen of the undifferentiated proteid being 17.82 per cent. The globulin thus approximates closely in composition to animal myosin, which contains per cent.: C, 52.82; H, 7.11; N, 16.77; S, 1.27; but the bulk of it coagulates at 70°, a temperature markedly different from the coagulation point of the myosin. The globulin also resembles the vegetable myosin which was obtained by Martin from papaw juice (1886), and may thus be called *maize-myosin*. The tendency to coagulate at several different temperatures may be explained by assuming that maize-myosin undergoes a gradual change when heated, and this assumption accords with Martin's observation (1887), that the myosins of wheat and rye are transformed into insoluble substances by heating their sodium chloride solutions at 35–40° for some time, and with Vines' view (*J. Physiol.*, **3**, 91–114) that phytovitellin may be transformed into phytomyosin. Maize-myosin is characterized by its solubility in cold, dilute, saline solutions, such, for instance, as those of the alkaline phosphates naturally present in maize meal, and by taking advantage of this property may be extracted directly from the meal without dissolving the second globulin. The cold aqueous extract of the meal is saturated with ammonium sulphate, and the crude maize-myosin thus precipitated is successively treated with water and 10 per cent. aqueous sodium chloride. The mixed extracts are then dialysed in a stream of water, and the myosin thus precipitated is washed with water, alcohol, and ether, and dried.

The second globulin, *maize-vitellin*, which forms the bulk of the original proteid matter, is obtained in small spheroids when the solution from which the maize-myosin has been separated by heat coagulation is dialysed in a stream of water. Its solution in aqueous sodium chloride is coagulable by acetic acid, but not by heat, and it contains more nitrogen than the original proteid matter, the average composition of several specimens prepared in this and other ways being: C, 51.71; H, 6.83; N, 18.12; S, 0.86; thus closely approximating to that of the phytovitellin of pumpkin seeds: C, 51.88; H, 7.51; N, 18.08; S, 0.60. It contains less sulphur than the myosin, and is, perhaps, as much akin to heteroalbumose as to the true globulins. Maize-vitellin is distinguished from maize-myosin by its solubility in weak, cold, saline solutions, and by its

tendency to separate in spheroidal form from sodium chloride solutions. It may, therefore, be extracted without the aid of heat coagulation from the crude proteid matter, prepared in the manner previously described, or from the meal remaining after the extraction of the myosin. The proteid matter, for example, is dissolved in 5 per cent. aqueous sodium chloride, and the vitellin is first precipitated by dilution with a large bulk of water, then redissolved by heating the whole to 45° , and finally caused to separate in spheroidal form by cooling the solution slowly to 8° . The crude product thus obtained may be purified and caused to aggregate into larger spheroids by repeating the treatment. Maize meal from which the myosin has been previously extracted by cold water may be treated with 10 per cent. aqueous sodium chloride, the crude vitellin precipitated by saturating the solution with ammonium sulphate, and purified by a somewhat long process which comprises dissolving the crude product in sodium chloride solution, reprecipitating it by dialysis, dissolving it again in salt solution, heating the solution to separate coagulable impurities, precipitating the now nearly pure product with acetic acid, redissolving the precipitate in sodium chloride solution, and, finally precipitating the pure vitellin by dialysis.

The third globulin, which is characterized by its solubility in dilute solutions of salts other than chlorides, and its insolubility in water, is obtained by long-continued dialysis of the solutions from which the other globulins have already separated. It was not observed in the preliminary experiments, owing to the slow rate at which ammonium sulphate and the alkaline phosphates diffuse. This globulin has the composition: C, 52.38; H, 6.82; N, 15.21; S, 1.26, and is thus distinct from the myosin and vitellin. It is further distinguished from these globulins by the low temperature, 62° , at which it is completely coagulated.

Various other substances isolated during the investigation were probably formed from the solutions by the incidental treatment, and do not exist as such in maize.

A substance, for instance, soluble in water, not coagulated by heat, and in general behavior resembling the proteoses, was left in solution in the dialyser after the removal of the myosin and vitellin in the differentiation experiments first described. It did not exist in the original proteid substance, since the latter did not yield

any proteid matter to boiling water; possibly it was formed by the hydrolysis of one of the less stable globulins.

Another substance, precipitated by the addition of a slight excess of very dilute hydrochloric acid to the sodium chloride solution of the undifferentiated proteid matter, was possibly an acid globulin. It contained 17.39 per cent. of nitrogen.

The most prominent of these secondary products, however, are certain substances insoluble in aqueous sodium chloride, which are invariably formed during the dialysing operations by the prolonged action of the water or sodium chloride on the myosin or vitellin, which in this respect resemble animal myosin and certain vegetable globulins. When, for instance, the clear sodium chloride extract of maize meal is dialysed, the precipitated globulins are no longer completely soluble in sodium chloride solution; and the same thing happens when the globulins are precipitated by the addition of ammonium sulphate to the solution, especially if the sulphate is somewhat acid, although in the latter case the insoluble portion of the precipitate may contain the acid globulin mentioned above. In the early stages of transformation, these insoluble substances resemble the alkali albuminates, for they dissolve in dilute aqueous sodium carbonate, and are reprecipitated on neutralizing the solution; but after more prolonged action they seem rather to resemble coagulated proteid matters. Their composition is fairly uniform; the mean percentage composition, for instance, of the products formed by the action of aqueous ammonium sulphate or water on the sodium chloride or aqueous extracts of maize meal and subsequent purification was: C, 53.45; H, 6.99; N, 16.11; S, 1.14; so that if these substances are formed from the globulin, the latter must undergo considerable modification. The change is not due to the alkali used in the purification, since a specimen which had not been purified in this manner was found to contain the same percentage of nitrogen. Since this percentage is low, it is probable that the insoluble substances are formed from the myosin and the soluble globulin, and not from the vitellin, and it is probably this tendency of the first two to pass into such insoluble modifications which facilitates the purification of the vitellin.

An aqueous or sodium chloride extract of maize meal yields, after the three globulins and the soluble salts have been removed by dialysis, two albumins and a proteid soluble in alcohol (proteose). The solu-

tion is treated with 10 per cent. of sodium chloride, and rendered slightly acid with 0.2 per cent. hydrochloric acid. The precipitated albumin (I) dissolves when washed with water, doubtless owing to the presence of hydrochloric acid; it is reprecipitated when the solution is carefully neutralized with dilute sodium carbonate, but dissolves in excess of the latter; after drying, this precipitate is no longer soluble in sodium carbonate.

The filtrate from (I), when boiled, yields a coagulum of a second albumin (II); the portion first formed contains appreciably less nitrogen than the later portions.

The filtrate from (II) contains a proteose (III) which may be obtained by adding absolute alcohol to the concentrated solution. It is doubtful if these three substances all exist as such in the maize kernel; some of them may be formed in the processes used to separate them.

The maize meal, after extraction with water, contains another proteid, *zein*, or *maize-fibrin* (IV), which can be extracted with warm 75 per cent. alcohol, and is precipitated when the alcoholic solution is poured into water. It is quite insoluble in 0.5 per cent. sodium carbonate, and in 0.2 per cent. hydrochloric acid; it dissolves in 0.2 per cent. aqueous potash, but is not converted into alkali-albumin, for the precipitate produced when the alkaline solution is neutralized is not soluble in excess of dilute acid, but dissolves in alcohol. It is converted, when warmed with water or dilute alcohol, into an insoluble variety, which, however, has the same chemical composition. Both of these varieties exhibit the ordinary proteid reactions. The carbon-content of this proteid is large.

The results of analyses of these substances are tabulated below:

	I.	II.	III.	IV.
C,	52.86—53.53	51.02—52.06	50.07—51.13	54.97—55.42
H,	6.86—6.79	6.57—6.79	6.54—6.91	7.15—7.35
N,	15.69—15.41	17.28—15.78	15.88—16.59	16.01—16.31
S,	1.48	} 25.75—24.64 {	2.37—1.62	0.53—0.67
O,	23.26		24.52—23.75	21.05—20.52

ON MAIZE OIL.¹

BY J. CRUICKSHANK SMITH, B.Sc.

The grain of the maize plant (*Zea Mais*), which is extensively used in the manufacture of starch, can be made to furnish an oil, whose properties would seem to render it suitable for several technical applications. At the suggestion of Professor E. J. Mills, the author recently examined a sample of this oil which is believed to be genuine, and the results are embodied in the present paper. The sample was of a bright golden color; it had a somewhat peculiarly "starchy" odor, and its taste was mild and not unpleasant.

Its specific gravity at 10° C. was 0.9267; at 15° C., 0.9244; and at 20° C., 0.9218. The mean co-efficient of expansion (corrected for glass) between 10° and 20° C. was 0.000706. Schaedler (*Technologie der Fette und Oele*) gives the specific gravity at 15° as 0.9215, and Professor Mills states that in 1884 he found a rather coarse brown sample to have a specific gravity of 0.9262. At — 10°, according to Schaedler, the oil sets to a solid mass. The author finds, however, that when exposed to intense cold, the oil becomes turbid, owing to the decomposition of solid matter at — 10°, and that below that temperature it becomes very viscous, but is still fluid at — 20°. The precipitated solid matter is entirely re-dissolved on warming again.

The bromine and iodine absorptions were as follows:

	Per Cent.
Bromine absorption,	66.50
Iodine absorption,	122.90
Iodine absorption (calculated; Br. absorption $\times \frac{127}{80}$)	105.50

It was observed that when the bromine solution remained in contact with the oil for more than fifteen minutes the results obtained were somewhat higher, and did not agree among themselves, owing, no doubt, to a secondary oxidizing action. A thick dark-colored sample was found by Professor Mills in 1881 to have a bromine absorption of 74.42 per cent.

On saponification with alcoholic potash, the total KOH absorbed was 19.34 per cent., which gives a "saponification equivalent" of 290.07. The oil was readily saponified in the cold, and it was at first thought that this ready saponification might be made use of for

¹ Abstract from the *Journal of the Society of Chemical Industry*, June 30, 1892; reprinted from *Phar. Jour. and Trans.*, July 16, p. 47.

the quantitative separation of maize oil from other oils; but while no other oil that has been examined gives such a high absorption in the cold as maize oil, many of them are undoubtedly acted upon under similar conditions, and concordant results could not be obtained.

The higher fatty acids present in maize oil seem to present no unusual features, but exact determinations as regards the proportion in which they are severally present were not made in the present instance. The volatile fatty acids, separated by Reichert's distillation process, in 100 parts of the oil required for their neutralization 0.56 parts of KOH.

A tendency to oxidize or to gum is almost absent in this oil. No decided siccative properties are communicated to it by simply "boiling" or by the addition of litharge to it. On passing a current of air through it for an hour at a temperature of about 150° C., the oil becomes slightly darker in color, and rather more viscous, but by no means to the same extent as cotton oil. If to the oil so treated a small quantity of borate of manganese is added, the oil acquires to a small extent siccative properties, and a thin film on lead dries in from ten to twenty hours, but not completely, being tacky to the feel at the end of that time. Like cotton-seed oil the eläidin reaction gives rise to a mass having a pasty or buttery consistency.

The rise in temperature when 5 cc. of strong sulphuric acid were mixed with 15 grm. of the oil was 89.0° C. For a non-drying oil this is a high figure, but it is in keeping with what may be called the "tenderness" of this oil in the presence of chemical reagents. The so-called qualitative tests for oils with sulphuric and nitric acid, etc., fail to give with maize oil reactions sufficiently characteristic to warrant their application in identifying or detecting this oil. Hence its bromine and iodine absorptions, its high Maumené figure, and the ease with which it saponifies in the cold, must be looked upon as the feature by which the oil may be best recognized.

Specimens of the potash and soda soaps were prepared, and both of these proved to be of good quality, being light in color, and readily and completely soluble in water. The soda soap is distinctly the harder of the two, but the potash soap is harder than the average "soft" soaps. Soap-making, therefore, is a use to which the oil might with advantage be put. The ease with which it

saponifies, also, might make it useful to mix with other oils to accelerate their saponification. As a lubricant it might in certain cases be applicable, its low acidity, and its small tendency to deposit solid matter or to "gum" being properties that recommend it for this purpose. The oil dissolves readily in acetone and more sparingly in alcohol or glacial acetic acid.

The viscosity was determined roughly by observing the time of flow of 5 cc. of the oil through a burette with a capillary point, and comparing the results with standard oils.

$$t = 18^{\circ} \text{ to } 19^{\circ} \text{ C.}$$

	Maize.	Olive.	Colza.	Mineral "901"
Specific gravity,	0.924	0.918	0.915	0.910
Time of flow,	177.3''	244.5''	290.0''	243.5''
Viscosity,	61.1	84.3	100	83.9
(Colza = 100) Colza (water = 1),	25.7	35.4	42.0	35.2

Maize oil thus possesses a striking individuality. In general, it may be said that in properties it is somewhat akin to cotton-seed oil. At the same time there are differences between them which are very marked.

THE USEFUL VARIETIES OF NUTMEGS.¹

BY DR. WARBURG.

The oldest works making mention of the nutmeg speak of several kinds which must have attracted the attention of the earliest Dutch travellers. In 1596, before the conquest of Banda, Linschoten mentioned two kinds of nutmeg—round and long—and in 1605, Clusius gave drawings of a fruit branch of *Nux myristicamus*, as well as the ordinary nutmeg.

In several of the older drawings of Piso and Valentini the leaves of the true nutmeg are incorrectly associated with the fruit of this second variety. The term *Pala metsiri*, often used by Piso, is probably also based upon a confusion of the true nutmeg with a variety. However, it is on the whole clear what is meant, and there is no

¹ Read at the meeting of the Berlin Pharmaceutical Society, June 2; reprinted from *Phar. Journal and Trans.*, July 2, 1892, p. 11.

doubt that all these remarks apply to the *Myristica fatua*, Houtt., a tree which certainly grows wild in Banda and Amboyna, perhaps, also in other of the Molucca Islands. Its fruit is scarcely at all aromatic when fresh, in the dry state not at all, while the mace smells disagreeable and not aromatic. The fruit is, therefore, only used medicinally in that island for dysentery, headache, or as an aphrodisiac, and they were brought from thence only as curiosities.

As the intercourse between the Moluccas and New Guinea increased, an entirely new kind of nutmeg came into the hands of Europeans, the *Myristica argentea*, Warb. That was probably first noticed in 1666. Since the middle of the 18th century it became an article of commerce in Eastern Asia. Towards the end of that century it was brought to Europe, and at the present time it is the most important article of export from New Guinea. Nevertheless this nutmeg remained undescribed and unknown, as well as the plant by which it is produced.

Warburg succeeded in obtaining information on this point through the assistance of a native who was persuaded to show him some of the trees in Dutch New Guinea. They were characterized by large leaves having a silvery appearance at the under side, and hence the name.

Next to *Myristica fragrans* the *M. argentea* is certainly the most important variety, and that which has the greatest future. The odor is not so delicate as that of the true nutmeg, but that may be due to the circumstance that it is not prepared and packed with as much care as the true kind. The export from the province of Onin is estimated by Beccari to have amounted to about 125 pounds at the middle of the 18th century, and it exceeded in importance that of all other produce. Since then the regular service of steamers has led to a great increase in this trade. Formerly, the nutmegs were sent in small parcels by ships to Banda, there treated in the same way as true nutmegs and sometimes mixed with them. Now they are all taken direct to Macassar where they are shelled and dusted with lime. The price of them in Macassar is about one-third that of the best quality of true nutmegs.

While formerly these nutmegs were used only in the Malay Archipelago, in the Philippine Islands, etc., by the natives, probably on account of their cheapness, as *Para papua* in the Malay country, as *Aniz moscada* in the Philippines, and came only occasionally to

Holland and England, they are now regularly imported by way of Amsterdam into England as long nutmegs, and they have been known in Germany since 1890 as horse nutmegs. Apart from the fact that the aroma is not so delicate the nutmegs are also very friable, but the broken fragments can be used for the production of essential oil. They are also very liable to be attacked by maggots even when they have been limed. The aroma is very permanent even when the nutmegs have been kept for a number of years. Samples dating from the previous century have still a strong smell when crushed.

Hitherto, the mace has not been brought into commerce. Samples of it brought to Europe have a dirty gray to brown-red color, but this is probably due to defective drying, since some of the nutmegs brought over by the author have a fine dark arillus that is very oily, and has a powerful odor. It is uncertain whether in drying the mace would acquire the yellowish red color of that from *M. fragrans*, but it is certainly capable of being made useful provided it can be properly prepared.

These nutmegs would come into actual competition with true nutmeg, only in the event of their being carefully cultivated and gathered, as the produce of *M. fragrans* is in Hainan, and it is not improbable that their lower price would be compensated by a larger yield.

The nutmegs of *M. argentea* differ from true nutmegs in their narrow, long shape, and the relatively less marked arillus furrows. The arillus generally consists of four broad stripes, which are united above and below. The same with the hard shell is from $3\frac{1}{2}$ to $4\frac{1}{2}$ cm. long and from 2 to $2\frac{1}{2}$ broad. It is broadest at the base and becomes gradually narrower towards the end, externally of a bright red-brown color when fresh, but as met with in commerce it is generally rubbed and of a yellow-brown color. The fruit is imbedded in a very thick pericarp, and when fresh it is from $4\frac{1}{2}$ to $6\frac{1}{2}$ cm. long and $4\frac{1}{2}$ to $5\frac{1}{2}$ cm. broad. The testa is nearly 1 mm. thick. The endosperm contains much starch, and the brown runcination streaks, which alone contain the aroma, are more scattered and coarser than in true nutmegs. The cotyledons are joined in a disc swelled at its edges to 5 mm. diameter.

Among other available kinds of nutmegs, the author mentioned *M. succedanea*, Reinw., discovered by Reinwardt in the island of

Tidore, one of the Moluccas, in 1821. The nutmegs can scarcely be distinguished from those of *M. fragrans*, and they are very aromatic. The leaves and flowers of this variety are, however, quite different from those of *M. fragrans*.

In New Guinea there is a great number of varieties of nutmeg plants, the produce of which possess some aroma, but though permanent it is generally too feeble to admit of these kinds being used to any extent as substitutes for true nutmegs.

As an adulteration of true mace the arillus of *M. malabarica*, Lam., known under the name of Bombay mace, has been used during the last two centuries. It is much larger and more cylindrical than the arillus of true nutmeg, and the several flaps are united at the apex, forming a conical structure. The anatomical structure is also different, as may be seen by the aid of a microscope. When moistened with hydrochloric acid the Bombay mace presents the marked peculiarity of assuming a greenish color.

“ON THE BEHAVIOR OF GALLIC AND TANNIC ACID IN THE ORGANISM.”¹

BY DR. C. F. MÖRNER.

It has been long known that when gallic acid is taken internally it can be found unchanged in the urine, and Wöhler and Frerich stated that when tannic acid is ingested it is excreted in the urine, as gallic and pyrogallic acid. Lewen afterwards showed that in the rabbit at least some tannic acid is met with in the urine after its ingestion as well as gallic acid, and six years ago Stockman proved that whilst in man some of the gallic acid taken passes unchanged, some of the tannic acid is excreted in the urine as gallic acid, and neither pyrogallic acid nor tannic can be found in the urine after tannic acid has been taken. In dogs and rabbits, however, the tannic acid is excreted, partly as gallic acid and partly unchanged, or at least in combination with alkalies. Mörner has made investigations which completely confirm Stockman's results, and has further estimated the amount of gallic acid present in the urine after definite doses of gallic and tannic acids. For this purpose he has employed a modification of a plan similar to that suggested by Wolkow and Baumann for the

¹ *Zeits. für Physiol. Chemie*, XIV, Heft 4 and 5; reprinted from *The Medical Chronicle*, July, 1892.

estimation of homogentisinic acid in the urine, which depends on the reducing action of gallic acid on ammoniated silver solution.

He finds that the proportion of gallic acid excreted in the urine largely depends on the amount given in one dose. If a drachm to a drachm and a half be taken 30 per cent. passes in the urine; if 30 grains only 21 per cent. After 22 grains only 5 per cent. could be detected; after 7-15 grains only 2 per cent., whilst a dose of 3 grains was not followed by the appearance of any gallic acid in the urine. As he examined the fæces in vain for any trace of gallic acid it follows that a certain portion is burnt up in the system in its passage through the body. He finds that after tannic acid has been taken only very little gallic acid passes into the urine. The administration of 30 grains to 60 grains of tannic acid is indeed followed by the appearance of a trace of gallic acid in the urine, but so small is the quantity that he could not estimate it. Only when two drachms of tannic acid had been administered was the quantity of gallic acid sufficient to allow of its quantitative estimation, but only one per cent. of tannic acid taken was found in the urine as gallic acid; since tannic acid could not be found in the fæces he concludes that the greater part of the tannic acid which is absorbed is burnt up in the body.

In explanation of the very small quantity of tannic acid which appears in the urine, changed into gallic acid, he suggests that the former forms with albumen, combinations difficult of solution; these pass into the intestine, and there slowly decompose. The tannic acid is, indeed, converted into gallic acid, but only gradually, and the small quantities of the gallic acid thus produced are burnt up and therefore, never appear in the urine. On the other hand, when gallic acid is taken, owing to its great solubility it is absorbed, and entering the blood at once, a small quantity only is burnt up and the larger quantity excreted.

MOLYBDIC ACID AS A COLOR REAGENT FOR CERTAIN AROMATIC OXY-COMPOUNDS.

BY J. STAHL.

Hager some time ago indicated a reaction for the tannic acid of galls and other tannic acids, according to which these substances give fine reddish-yellow colors with ammonium molybdate. I have found that the same reactions occur for certain compounds

approximating on tannin, pyrogallol, pyrogallo-carbonic acid, and gallic acid. As all four substances named contain oxy-groups in an ortho-position to each other, the reagent was tried also for other aromatic compounds in which the same case occurs. The result was that ammonium molybdate is a specific color reagent for all aromatic compounds which contain two or more oxy-groups standing in the ortho position to each other.

Ammonium molybdate produces intense phenomena of coloration only with such bodies, which, according to the substance employed, may be yellow, reddish-brown, or blackish-brown. On the contrary, in all organic compounds in which the above-mentioned condition does not occur no coloration is recognized. Thus, with pyro-catechin on the addition of the molybdate there is shown an intense reddish-brown color, which does not appear with hydroquinone and resorcine—a behavior which shows phloroglucine in contrast to pyrogallol. The following aromatic compounds display similar colorations: Protocatechuic acid, caffeic and hydrocaffeic acid, phenanthrenehydroquinone and retenehydroquinone; in alizarin, purpurin, anthragallol, and rufigallic acid, the aqueous solutions of which are yellow or red, the tone is much intensified by an addition of the molybdate. The entrance of other groups into the nucleus does not generally interfere; thus the reaction appears in the bromo and nitro-derivatives of pyrogallol and gallic acid, but not in the phenol ethers, where one or more hydrogen atoms of the oxy-group are replaced by alkyls, as guaiacol and vanilline. Very slight yellow colorations which may occur with the two last-mentioned bodies are probably due to slight impurities. Among compounds of a less fully known constitution the reaction is produced by quercitrin and its scission product quercetin, apomorphin, podophyllin, koussein and aloin.

The aqueous solution of free molybdic acid behaves exactly like ammonium molybdate. The latter, in presence of organic substances, passes to a lower stage of oxidation, with the production of a blue, yellow, or a reddish-brown.

The origin of the color phenomena in question depends on the oxidizing action of molybdic acid and its ammonium salt. As those aromatic compounds which contain oxy-groups in the ortho-position to each other are more unstable and especially more readily oxidizable than their isomers, there occurs here a more

energetic reduction of the molybdic compounds. The stage of the blue oxide is overleaped, and there appear at once the lower brownish stages of oxidation. If heat is applied and the reaction is prolonged, brownish-black masses separate out which are found to be a variable mixture of lower molybdic acids, whilst a portion of the organic substance is oxidized to carbonic acid and water. But it is not impossible that there may appear simultaneously yellow or brown oxidation products of the oxy-compounds.

The sensitiveness of these reactions is not very great, but in case of pyrocatechin, pyrogallol, gallic acid, and tannin, it admits of the recognition of 0.1 mgrm. substance in one cc. of liquid. The action of sodium tungstate is similar to that of ammonium molybdate.—*Chem. News*, June 24, 1892, p. 302.

THE FLAME OF BURNING NITROGEN.

BY W. CROOKES, F.R.S.

Nitrogen is a combustible gas; that is to say, a mixture of nitrogen and oxygen (atmospheric air), will under certain conditions burn with a flame, and production of nitrous and nitric acids. The reason why, when once nitrogen is set on fire, the flame does not spread throughout the whole atmosphere and deluge the world in a sea of nitric acid, is that the igniting point of nitrogen is higher than the temperature produced by its combustion, and therefore the flame is not hot enough to set fire to the adjacent gas.

In the experiments shown at the *Soirée* of the Royal Society, on June 15, an electric current of 65 volts and 15 ampères, alternating 130 times a second, was passed through the primary of a large induction coil, when an arching flame, consisting chiefly of burning nitrogen, issued from each of the secondary poles, meeting at the centre. When once started the poles can be drawn asunder till the flame bridges across 212 mm. When the terminals are more than 46 mm. apart, the flame will not strike across. When alight the flame is easily blown out by the breath, and it can then be re-lighted by a taper.

In the spectroscope the flame of nitrogen shows no lines, the spectrum being faint and continuous. The temperature is a little higher than that of a good blow-pipe flame, easily melting fine platinum wire. The hot gases rising from a flame have a strong

odor of nitrous acid, and when it is produced in a closed globe, the interior rapidly fills with red gases.

The flame produced by exciting an induction coil by means of an alternating current was first observed by Mr. Spottiswoode, F.R.S., who described it before the Royal Society in 1880. It has lately been exhibited on a magnificent scale at the Crystal Palace, by Messrs. Siemens Bros., and by Messrs. Swinburne & Co. It is not known, however, that any chemical explanation of the flame has before now been published.—*Chem. News*, June 24, 1892, p. 301.

THE SEPARATION OF SALICYLIC ACID FROM BENZOIC ACID.

BY MISS J. SCHAAP.

There does not at present exist a good quantitative process for the separation of these acids, and hoping to effect this I first tried the precipitation with alum. I found, however, that the aluminum benzoate is not quite insoluble in water, so the method is therefore valueless for quantitative purposes. Better results were obtained by the following method :

A few mixtures, each consisting of 0.25 grm. of salicylic and 0.25 grm. of benzoic acid, were dissolved in a sufficiency of hot water and the liquids were then allowed to cool. The salicylic acid was now precipitated by excess of bromine water, but the question had to be decided whether it was precipitated as the mono-, di-, or tri-bromo compound. I, therefore, took 0.25 grm. of the bromo-salicylic acid and estimated the bromine by Fresenius' lime method. The nitric acid used was free from chlorine, but the lime was not, so a check had to be made. Allowing for the small quantity of chlorine in the lime, the results in four experiments were, respectively: 0.305, 0.315, 0.319 and 0.314 grm. of AgBr. Theory requires 0.215 grm. for the mono-compound, 0.316 grm. for the di-compound, and 0.374 for the tri-compound ; so it follows that the precipitate consisted of the di-compound.

Another question now arose whether the precipitate was sufficiently insoluble in water, and also whether the precipitation was complete. To solve this question 0.25 grm. of salicylic acid was dissolved in water and precipitated with bromine water. Having found that the bromo-compound is very readily soluble in chloroform, I concentrated the filtrate at a temperature of 30° and agitated

the liquid with chloroform, which on evaporation did not yield the smallest residue, showing that all the salicylic acid had been precipitated. The precipitated dibromo-salicylic acids were dried in a desiccator and afterwards weighed. The weights were, respectively: 0.56, 0.556, 0.551 and 0.553 grm., theory requiring 0.536 grm.

In order to directly estimate the benzoic acid, the filtrates were rendered faintly alkaline with sodium carbonate, and evaporated to a small bulk on the water-bath to expel the excess of bromine. The residues were then put into separatory funnels, acidified with hydrochloric acid, and shaken out with chloroform. This was filtered through a dry filter and allowed to spontaneously evaporate in weighed glass dishes. The results were, respectively: 0.272, 0.261, 0.237 and 0.232 grm. of benzoic acid, instead of 0.250 grm.—*Ned. Tydschr. v. Pharmacie, etc.*, July, 1892; *Chemical News*, vol. 66, p. 43.

AMERICAN PHARMACEUTICAL ASSOCIATION.

Most of the members and delegates who attended the fortieth annual meeting of the American Pharmaceutical Association, followed the advice of the local secretary and the Committee on Arrangements, that Boston be considered the gathering point for those whose route of travel would permit.

On Saturday, July 9, the members began to arrive there, nearly all stopping at the Hotel Vendome, Commonwealth Avenue and Dartmouth Street, where elegant quarters had been provided. A Committee of Entertainment and a number of special committees, representing the pharmacists and druggists of Boston and Massachusetts, took charge of the visiting members and their ladies, and were unremitting in their attentions. For Monday, July 11, excursions had been planned to Bunker Hill Monument and Charlestown, to Cambridge and Harvard University, to Concord, Lexington, Plymouth and Salem, each one being conducted by a special committee. Tuesday was set apart for a harbor excursion on the steamer *City of Jacksonville*, starting from Battery Wharf and landing at Bass Point, where a sumptuous fish dinner was served. Returning to the city shortly after noon, the remaining portion of the day was devoted to a carriage drive, starting from the Vendome at about 3 o'clock. Many places of interest in the city and suburbs were visited, and in the evening a delightful reception was tendered to the visitors at the Vendome, with music and refreshments, the company separating towards midnight. On the following morning, Wednesday, the journey to the place of meeting was undertaken in a special train, which landed the excursionists at Alton Bay on Lake Winnepisaukee, where a steamer was in waiting, with a committee of the New Hampshire pharmacists, who vied with their Massachusetts brethren in entertaining the visitors while on their way to the Profile House. Music had been provided, as well as an excellent luncheon and other enjoyments, and before the company disembarked at Weirs, President Finlay gave expression

to the high appreciation of the constant courtesies shown, closing with a proposition for three cheers for the generous hosts, which was heartily endorsed, and ardently carried out. The last portion of the trip was made by rail through the Pemigewasset Valley to Bethlehem Junction, and thence to the Profile House, arriving there about supper time. The arrangements had been made with such foresight that, on arrival at the hotel, every one of the party found the baggage, which had been sent by a different route, already in the room assigned for his or her occupancy during the next five or six days.

After supper a meeting, lasting until after midnight, was held by the Council to arrange the business for the Association.

First Session, Thursday Morning, July 14.—Shortly after ten o'clock the meeting of the Association was called to order in the large parlor of the Profile House, when President Finlay introduced Mr. A. P. Preston of Portsmouth, N. H., who, in behalf of the pharmacists of New Hampshire, spoke words of welcome and of best wishes for a successful meeting, and after referring to the grand scenery and the varied attractions in the State, briefly outlined the program of entertainment following the meeting, and expressed the appreciation to the ladies for the part they had taken in New Orleans in suggesting the White Mountains as the place for meeting, closing by saying: "We thank you sincerely, ladies; you have shown excellent judgment and your husbands excellent taste in following your suggestion." Vice-president Toibert was called upon to reply, which he did in a happy manner, referring to the generous hospitality, pledging return as occasion may offer, alluding to the community of interests between pharmacists everywhere and the American Pharmaceutical Association, and closing with a reference to the influence of New England upon the growth of the republic.

President Finlay, in his presidential address, called attention to the fact that this very day was the one hundredth anniversary of the first president of this Association, Daniel B. Smith, who was born in Philadelphia, July 14, 1792, and in October, 1852, was elected president of the National Pharmaceutical Convention, and of the American Pharmaceutical Association then organized. Mr. Finlay then passed in review the action of the representatives of the Association during the past year, referring to the address of congratulation sent to the Pharmaceutical Society of Great Britain; to the conference with the National Wholesale Druggists' Association relating to the fixation of prices for proprietary articles; to the section of *Materia Medica* and Pharmacy of the American Medical Association, and to the invitation extended for holding the Seventh International Pharmaceutical Congress in Chicago. The progress in the revision of the U. S. Pharmacopoeia was alluded to, and reference was made to the continually increasing number of synthetical remedies, some of which proved to be material quite unremunerative on the necessary investment. In closing, allusion was made to members who have faithfully served the Association, aiding in its counsels and enriching its literature, and who have given the results of their patient labor and inventive genius, and it was suggested by the President, that to them some token of appreciation, some tribute of esteem was due, which might be in the form of an emblem bearing an appropriate motto, or a scroll suitably inscribed.

The address was referred to a Committee of three, which subsequently reported on the suggestions, and approving of the last one, recommended its

reference to a Committee of five for formulating a plan embodying the president's idea.

The list of delegates, which was reported by the Council, showed that delegations had been appointed from

Colleges of Pharmacy : Chicago, Cincinnati, Denver, Illinois, Louisville, Maryland, Massachusetts, National (Washington), New York, Philadelphia and St. Louis ;

State Pharmaceutical Associations : Alabama, Arkansas, Colorado, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Missouri, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Virginia, Washington, Wisconsin, Nova Scotia and Quebec ;

County and City Associations : Cleveland, O.; Houston, Tex.; Kings Co., N. Y.; German Apothecaries, New York ;

Alumni Associations of Colleges of Pharmacy : Cincinnati, Maryland, Massachusetts, New York, Philadelphia and St. Louis.

The Secretary of the Council presented the names of 289 candidates for membership. Intimation being made that objections might be made to one of the candidates, voting on the admission was for the present postponed.

Reports of Committees were called for and laid upon the table for future action.

A telegram was received from Dr. Henry O. Marcy, President of the American Medical Association, conveying the hearty sympathy of that Association, and regretting that he had been unexpectedly detained.

The appointment of the Nominating Committee was effected in the usual manner, one or two representatives being named from each State or Province ; the representatives of six other States arrived too late to be represented on this Committee. Messrs. Diehl, Ingalls, Fennel, Keppler and Ramsperger were appointed from the association at large.

The Secretary of the Council read the minutes of that body since the New Orleans meeting, which were approved. Besides the business transacted in the interim between the two meetings, and the arrangement of the business for the present meeting, various reports of officers and committees had been examined and passed upon.

The Committee on Membership reported the decease of 29 members and 2 honorary members during the preceding year.

The Committee on Publication recommended that the plan, inaugurated last year, of furnishing each member with a printed copy of the minutes, in pamphlet form, and in advance of the bound copy of the Proceedings, be continued in the future. Quite a number of partial and complete sets of the Proceedings have been sold during the past year, realizing \$271.15, and these sales have reduced several of the older issues to such an extent that they are likely to be soon completely out of print.

There is still a steady demand for the National Formulary; during the eleven months ending May 30, 1892, the cash receipts from this source were \$799.40, and the expenses \$292, making the total cash profit to the Association, since 1888, amount to \$2,660.71, aside from the 1,421 copies which have been furnished gratuitously to the members and others.

Including cash balance on hand at the beginning of the last fiscal year, amounting to \$6,670.33, the Treasurer reported the total receipts for the eleven months to have been \$12,962.75, and the total disbursements \$9,128.42, the latter sum including \$3,021.62 for permanent investment, leaving a balance on hand, June 1, of \$3,834.33, which was decreased July 1 to \$3,703.25.

The invested funds in the custody of the Chairman of the Council are as follows :

Ebert fund,	Cash, \$62 25 and bonds	\$600 valued at	\$699 00
Centennial fund,	" 188 99 "	1,100 "	1,282 00
Life membership fund,	" 772 47 "	8,100 "	9,436 50
General fund (see Treasurer's report),	"	3,000 "	3,000 00

Prof. Whelpley gave notice of an amendment to Chap. iv, Article iv, of the by-laws, increasing the Treasurer's salary from \$600 to \$750, which was adopted at a subsequent session.

After the appointment of a Committee on the time and place of the next annual meeting, consisting of Messrs. Sheppard, Remington, Main, Sloan and Ebert, the Association adjourned until 4 o'clock, P. M.

Second Session, Thursday afternoon.—After the reading and approval of the minutes, the Nominating Committee submitted the following nominations for officers for the next year : President, Jos. P. Remington, Philadelphia ; Vice-presidents, A. P. Preston, Portsmouth, N. H. ; S. P. Watson, Atlanta, Ga., and W. H. Averill, Frankfort, Ky. ; Treasurer, S. A. D. Sheppard, Boston ; Permanent Secretary, J. M. Maisch, Philadelphia ; Reporter on the Progress of Pharmacy, Henry Kraemer, New York ; members of Council, H. M. Whitney, Lawrence, Mass., Gust. Ramsperger, New York, and Chas. E. Dohme, Baltimore. In regard to the office of reporter it was stated that Dr. Rice had positively declined a re-election, because he could not give to the work the personal attention which it ought to receive ; also, that Mr. Kraemer has made, under Dr. Rice's supervision, a portion of the abstracts and compilations for the report of the current year. All the nominees were duly elected.

The Committee on International Pharmaceutical Congress presented a report through the chairman, Prof. Oldberg, in relation to measures to be taken for the Seventh International Congress, to be held in Chicago next year, all of which were referred to the Council with power.

Prof. Diehl made a report for the Committee on National Formulary, discussing the popularization of the Formulary and its revision under the headings of corrections, additions and eliminations. The report was accompanied by a lengthy epitome of criticisms on the present National Formulary, arranged in three parts, giving abstracts from journals, a synopsis of communications from members of the Committee, and the results of examination of typical specimens of National Formulary preparations, after having been kept on hand for nearly four years. The report shows that the formulas of the National Formulary have proved to be very satisfactory, that very few alterations have been proposed, that very few additions have thus far been suggested, and that the preparation of a final report cannot be undertaken until after the publication of the new pharmacopœia.

The report of the Committee on time and place of meeting, recommended Chicago, the time to be designated by the Council, which was adopted.

Amendments lying over from last year were then considered. The amend-

ment to Art. iv of the Constitution, changing the word shall to may, created much discussion, but was finally tabled, when it was shown that the word shall was not mandatory, but merely directory, and that the interest from life membership was to go into the common account, merely in lieu of the annual contributions of contributing members.

Chapter ix, Article viii, of the by-laws, was amended so as to give two sessions to the Section on pharmaceutical legislation and education. The proposed amendment to Chapter viii, Art. v, to receive delegations from State pharmaceutical associations only, was laid on the table.

A communication from Mr. Abernethy, relative to the publication of an official dose book, was read and referred to the Section on scientific papers.

The Section on Commercial Interests held its sessions on Friday, July 15, the chairman, W. H. Torbert, presiding; A. Bassett, Secretary. The Committee appointed at New Orleans reported that they had been present at the meeting of the National Wholesale Druggists' Association at Louisville in October, 1891, and conferred with that Association and the Association of Manufacturers and Proprietors with the result that the plan for the prevention of cutting of prices elaborated at New Orleans was adopted by the two Associations named, with slight modifications, and that a committee had been appointed, consisting of members of the three Associations, with the view of working out the details and taking steps to put the plan in operation. The chairman in his address stated that while the plan had been very generally approved, even by lawyers in many States, some lawyers considered it to be in conflict with the anti-trust laws, and that this opinion had been a stumbling block in the way of its successful and general adoption.

Letters referring to the same subject were read from a Committee of the Michigan State Pharmaceutical Association, from the president of the Interstate Retail Druggists' League at St. Louis, and from the Illinois Pharmaceutical Association.

A communication from the Colorado State Pharmaceutical Association urged that efforts be made for securing the repeal of the annual tax of \$25 imposed upon druggists for the purpose of retailing liquors for medicinal use and distilled spirits for mechanical purposes.

A communication from the Arkansas Association of Pharmacists suggested a memorial to the Congress, urging the repeal of all copyright laws which protect the names or the process of manufacture of any and all chemicals and remedies used for the relief of human suffering which are put up and recommended to the use of physicians and others, no matter under what name or form, except those agents known as patent or proprietary remedies.

The discussion took a wide range, and it was finally concluded that a Committee of three consider the subject and report at the final session to the Association, which was done by recommending that the proprietors put the A. P. A. plan in force promptly, and omit the delay in the submission of it to the retailers for approval. Messrs. Torbert, Bassett, Hechler, Rano and Canning were appointed a special committee of the Section for the prevention of cutting, and the same committee was also recommended to the Association for appointment as delegates to the National Wholesale Druggists' Association.

Among the resolutions passed by the Section were the following :

That all manufacturers of medicinal preparations be requested to devise simple methods of marking all packages for retail use so as to facilitate determining the source of supply of such goods.

That the Association urge thorough local organization in every centre for the purpose of supporting the A. P. A. plan ; also,

That it be requested that the proceedings of the commercial Section be specially printed as soon as possible in pamphlet form, and be sent to every member of the Association.

The Section re-elected its officers for the ensuing year : W. H. Torbert, chairman, and A. Bassett, secretary, and added Messrs. C. O. Rano and G. L. Hechler as members of the committee.

The Section on Scientific Papers held three sessions on Saturday, July 23, Prof. Hallberg in the chair ; in the absence of Secretary Snow, Professor Fennel acted in that capacity. The following papers were read :

Chemical Symbols.—W. W. Kerr, Batesville, Ark., suggested that in addition to the names of chemicals also the chemical formulas be placed upon the labels of the containers.

Examination of the Amyl Nitrite of Pharmacy.—Prof. Curtman read an elaborate paper on this subject, exhibited the apparatus and showed the practical working of the process, which is an adaptation of that devised by Allen for spirit of nitrous ether, while the instrument is a modification of Lunge's nitrometer. The method is based upon the conversion of amyl nitrite, by the addition of potassium iodide and sulphuric acid, into amyl alcohol, potassium bisulphate, free iodine and nitric oxide (NO or N_2O_2), one molecule (116.78 gm.) of amyl nitrite yielding one molecule (29.97 gm. = 22321.2052 cc.) of nitric oxide gas ; or 0.5231797 gm. of the former yield 100 cc. of NO . The analysis is made by filling the nitrometer, including the bore of the stopcock at the top, with a saturated aqueous solution of sodium chloride ; 0.523 gm. of the amyl nitrite diluted with about 5 cc. of alcohol, is now added through the stopcock with the precaution of not admitting any air, and of washing down the last portions of the nitrite with a few cc. of the salt solution. The reagents are used in the strength of normal volumetric solutions, 10 cc. of KI solution being introduced first, followed by 10 cc. of normal H_2SO_4 . A strong effervescence takes place, but the reagents being specifically lighter than the salt solution, some agitation is necessary to complete the reaction which is usually accomplished in about five minutes. The nitrometer tube being connected by means of a rubber tube, with an open equilibrium tube, the latter is now lowered until the liquid in it is about 3.3 cc. lower than that in the measuring tube, when the number of cc. of NO gas is read off and noted. The correction for temperature must be made by dividing the number of cc. by the volume in cc., to which 1 cc. of NO , measured at 0°C ., will expand at the temperature prevailing at the time of making the experiment (the increase for each degree C . = 0.03663 cc.) ; the correction for pressure is made by multiplying with the present pressure in mm., and dividing by 760 mm., the normal pressure—or by multiplying with the present pressure in inches and dividing by 30. The number of cc., thus corrected, gives the percentage of amyl nitrite in the specimen.

Examining fifteen samples by this method, four were found to contain between 27.14 and 39.60 per cent., one 59.33 per cent., three over 60 per cent.,

three over 70 per cent., three over 80 per cent., and one 93.71 per cent. of amyl nitrite. The preparation must be preserved with the utmost care, and particularly protected from light. A specimen assaying 65.35 per cent., after having been kept on the prescription desk for three months contained only 39.60 per cent. of amyl nitrite; and another sample assaying 84.235 per cent., after one week's standing in a white glass vial was reduced to 71.32 per cent. amyl nitrite. The nature of all the impurities present was not determined; one sample contained much amyl valerianate and some butyl nitrite. Attention is directed by the author to the fact that the addition of methyl alcohol to amyl nitrite converts the mixture into amyl alcohol and gaseous methyl nitrite; and that the addition of ethyl alcohol gradually results in the production of ethyl nitrite and amyl alcohol.

Economic Percolation was the title of a paper presented by Harry Vin Army, in which the results of numerous observations were given, showing the loss of alcohol by evaporation in conducting the process of percolation. In estimating this loss the amount of percolate was taken into consideration, and the marc remaining in the percolator was subjected to distillation in order to recover the alcohol as far as practicable. To guard against this loss or reduce it to a minimum, an air-tight percolator was constructed, resting upon a receiver, terminating below with a tapering bottom, provided with a straight faucet; the two parts are fastened together by means of a screw joint, and further connected by means of a tube extending from the top of the percolator to the top of the receiver. In order to facilitate the withdrawal of the percolate from the faucet, the top of the receiver is provided with an additional orifice through which air is admitted, but which is closed with a screw cap while percolation is going on.

The separation of strychnine and brucine was discussed in a paper by H. W. Snow. Various processes for estimating the strychnine in mixtures of the two alkaloids were tried without satisfactory results. On treatment with nitric acid, sp. grav. 1.056, it was found that a portion of the strychnine was destroyed. The author regards the subject as a most discouraging one, and though he has performed many experiments, has as yet nothing but negative results to offer. It should, however, be stated that the process suggested by Gerock (*Amer. Jour. Phar.*, 1889, p. 180) has not been tried by Mr. Snow.

Aromatic spirit of ammonia.—A. Conrath observed that using ammonium carbonate picked out of a cask opened for the purpose, a preparation could be made by the pharmacopœial process, without containing a permanent precipitate. Using the carbonate as ordinarily met with, a precipitate usually occurred, even after increasing the quantity of ammonia water, if the alcohol had been added at once, but on leaving the alkalies together for several hours before adding the alcohol, no precipitate was formed. The author suggests the use of bicarbonate of ammonium as leading to greater uniformity in the strength of the preparation.

American Potash.—Prof. Lloyd has found commercial potash of very uneven quality, and the commercial terms of first, second and third sorts to have no definite significance, since the poorest potash is sometimes sold as first sorts; the adulteration consists chiefly of table salt and lime. In the casks examined the carbonate and hydrate combined assayed sometimes as low as 16.5 per cent. KOH, while casks were met with assaying sometimes as high as 91 per cent.

KOH. The author believes that if a standard of at least 70 per cent. KOH were authoritatively established, low grade potash would then be prevented from entering the general market, and the product would be improved.

The juice of taraxacum.—Prof. Sayre collected the root May 10; drying it at 45° it lost 79.42 per cent. of moisture, and this on drying at 100°, lost further 10.68 per cent. The fresh root yielded by pressure 57 per cent. of juice, of spec. grav. 1.007, and containing total solids 1.472, sugar 0.036, and ash 0.0045 per cent.

Oil of Wintergreen is proposed by B. H. Ewing, to be assayed volumetrically by saponifying 5 gm. of the oil with 40 cc. volumetric solution of soda at 60° C.; after the precipitate formed at first has totally disappeared, cool the flask, then boil for five minutes, again cool, add phenolphthaleine, and titrate with normal hydrochloric acid until the red color disappears; subtract the volume of acid required in cubic centimetres from 40, multiply the remainder by .138 ($\frac{1}{1000}$ molecular weight of salicylic acid) and the resulting product by 20 to get the percentage of salicylic acid. Methyl salicylate is obtained by using in the calculation the figure .152 in the place of .138. The results agree closely with those obtained by determining the salicylic acid gravimetrically. Genuine oil of gaultheria assayed 90.15 salicylic acid and 99.30 methyl salicylate. Genuine oil of sweet birch yielded 90.20 acid and 99.40 of the methyl compound. In an adulterated specimen only 68 per cent. of methyl salicylate was indicated by this method.

Solution of bimeconate of morphine.—A commercial sample examined by Alice L. Braunwarth yielded 0.908 per cent. solid residue containing 0.80 morphine, 0.085 meconic acid and 0.091 HCl. The solvent was diluted alcohol of 24 per cent. by weight.

The botanical names of the U. S. Pharmacopœia have been examined by Professor H. H. Rusby, in accordance with the rules adopted by the International Botanical Congress, held at Paris in 1867, according to which no name has a right to supersede the first name properly given to a plant since the binomial nomenclature was adopted by Linnæus. In an elaborate paper presented by the author, the names and synonyms are given and the authorities cited with the dates of first publication. If the rule is to be strictly followed, a number of botanical names will have to be changed.

The chemistry of the elements entering into Syrup of phosphates of iron, quinine and strychnine, U. S. P., by Professor Fennel, is an inquiry into the causes of the changes produced in this pharmacopœial product, and he arrives at the conclusion that with the exercise of the greatest skill and judgment the precipitation of basic ferric phosphate cannot be prevented and that the formation of this basic salt is the result of natural influences; further, that the precipitation may be accelerated by the careless preparation of any one of the compounds which enter into the final product, and that a lack of skill and judgment and the necessary precautions essential to the production of trustworthy compounds, apparently indicate a defective formula; yet such is not the case, for the formula is as perfect as man can make it.

Calcium hypophosphite was examined by Prof. Sayre by Moerk's method (see Amer. Journ. Phar., 1889, pp. 326 and 391), with potassium permanganate, the five samples assaying 96.92, 98.23, 99.16, 99.32 and 99.71 per cent., the balance being sulphate and carbonate.

Syrup of calcium lactophosphate was the subject of two papers by H. W. Aufmwasser, one giving the results of an analysis; the other containing a formula for its preparation, as follows: Dissolve calcium carbonate 21.3 p. in a mixture of phosphoric acid (50 per cent.) 109.4 p. and lactic acid 33 parts, previously diluted with orange flower water 80 p. and water 150 p., filter and wash with water to obtain 400 parts of filtrate, in which dissolve sugar 600 parts.

The cultivation of coffee in Jamaica.—This paper is reprinted on p. 396 of the present number.

Reaction between borax, sodium bicarbonate and glycerin.—Attention is again directed by Professor Lloyd to the decomposition which takes place between the two salts when in solution with glycerin, whereby one-half of the carbonic acid is liberated as gas. This reaction was explained in pharmaceutical and chemical journals in the years 1877 and 1878.

Acid sublimate dressing.—A. Levy suggests the preparation of compressed tablets containing mercuric chloride 3.5 and tartaric acid 17.5; these dissolve readily in warm water, and such solutions are well adapted for use as dressings. Solutions of corrosive sublimate are rendered inefficient as antiseptics by contact with albuminous and other organic matters; to counteract this effect, tartaric acid has been recommended (see *Am. Jour. Phar.*, 1888, 146, 404, and 1890, 554); also citric acid (*ibid.*, 1887, 355) and sodium chloride (*ibid.*, 1887, 396, and 1888, 407).

The practical use of the microscope in pharmacy was discussed in a paper by Dr. A. R. L. Dohme, of which an abstract cannot be made; the paper is illustrated by drawings of the transverse sections of pareira brava root and coca leaf.

Papers were also read on phosphate of iron and phosphoric acid, by L. F. Stevens; on glycerin in syrups, by L. F. Stevens; on the alkaloids accompanying berberine, by W. W. Birkiuer; on the relationship of these white alkaloids, by R. D. Young; on the action of hot sulphuric acid upon bees-wax, paraffin and ceresin, and one entitled laboratory notes, by F. A. Thompson. Several of the papers presented had been prepared by non-members, and were accepted by formal vote and referred. Subsequently two papers were handed in by Prof. Kremers, entitled notes on queries and the menthol group.

The Committee on Prize Essays reported that the Ebert prize for 1891 be awarded to Prof. Lloyd for his paper, entitled "a scheme to establish a comparative standard for alkaloidal galenicals." A special committee for the examination of papers, marked "for competition" and read at the present meeting, reported in favor of awarding the first prize offered in 1887 (\$75) to Prof. Fennel, and the second prize (\$50) to H. V. Arny. These reports were adopted by the Section.

The officers of the Section for the ensuing year are: C. T. P. Fennel, Cincinnati, chairman; F. G. Ryan, Philadelphia, secretary, and Chas. Caspari, Jr., Baltimore, third member of the Committee.

The Section on Pharmaceutical Legislation and Education held its sessions on Monday, July 18, Prof. A. B. Stevens in the chair. In his annual address he referred, among other subjects, to a decision of the Supreme Court of Michigan affirming the constitutionality of that clause of the Michigan pharmacy law which prohibits physicians from conducting a pharmacy store without proving their qualification for it by passing the required examination before the pharmacy board.

Reference was also made to a bill which had been presented to the present Congress, requiring that the positions of apothecaries in the Navy be declared vacant, unless the present incumbent held a diploma from a College of Pharmacy or a certificate of examination from a State or County Board of Pharmacy, and that new appointments be hereafter made only from those who have graduated from a recognized College of Pharmacy. The Chief of the Bureau of Medicine and Surgery opposed this legislation, because it would summarily dismiss a large number of apothecaries who are entirely competent and who are doing faithful service, and because the present laws and regulations were entirely adequate; this view was concurred in by the Secretary of the Navy.

Secretary Hogan presented a lengthy report on the instruction given in the forty-eight colleges, schools, and college or university departments, existing in the United States and Canada; several of these have, apparently, only a nominal existence.

Professor Simon, in answer to a query, read a paper in advocacy of *extending the college course* in pharmacy to three years, but in opposition to the suggestion that the third year's course be devoted to physiology and therapeutics; there is ample room, and also necessity, for increasing the work in practical chemistry and other branches directly pertaining to pharmacy without encroaching upon the field properly belonging to the physician.

A paper by Prof. Sayre on *the teaching of pharmacy to medical students* suggests that this should necessarily be limited to the physical properties of preparations, and the general processes for making them, to their relative strength, to the chemical constitution of drugs and to their behavior in combinations. Regarding the therapeutical knowledge desirable for the pharmacist, the author thinks that the latter may advantageously know what remedy is applicable in certain classes of disease, but the physician must know definitely by practice the details of treatment in the use of the remedy.

A paper on *the Hospital steward in the U. S. Marine Hospital Service*, by L. A. Duëkert, deals with the various duties of this officer, which comprise those of a competent pharmacist, and a good book-keeper, and require some executive ability and sufficient knowledge of mechanics to superintend repairs. The course to be pursued for admission to this branch of service is likewise indicated in the paper.

Notes on Pharmaceutical Education, read by Prof. E. Kremers, deal mainly with the study of materia medica. This term, in its broadest sense, embraces now several distinct branches of science like pharmacognosy, pharmaco-chemistry, pharmacodynamics, therapeutics and pharmacomorphics (or pharmacopoetics). The author then outlined several methods for teaching pharmaceutical materia medica, and arrives at the conclusion that the salvation of the pharmacist does not lie in making all microscopists or all analytical chemists, but that it will be achieved by raising all to the highest educational standard prevalent in the country, and by allowing the individual to find for himself the special field for which he is best fitted.

A proposition made by Mr. Alpers, of Bayonne, N. J., that all applicants for examination by the Pharmacy Boards should have previously graduated from some reputable college of pharmacy, created a great deal of discussion, mostly in opposition. Since Mr. Alpers is neither a teacher, in nor a member of, a college of pharmacy, it seems evident that his proposition was made in

the interest of pharmaceutical education; it was withdrawn and no action taken.

A resolution offered by Prof. Fennel, that all reputable colleges of pharmacy be recommended to adopt a three years' course as soon as practicable, was adopted.

Prof. Robert G. Eccles, of Brooklyn, was elected chairman for the ensuing year, and L. C. Hogan, Chicago, was re-elected secretary.

The final session of the Association was held on Monday evening, when the names of additional candidates for membership were reported, making a total of 400 received at this meeting. The Nominating Committee proposed Prof. Hallberg for local secretary for the next meeting, but he declining, nominated Mr. Henry Biroth, who was duly elected.

Professor Remington read the report of the delegates to the Section of Materia Medica and Pharmacy of the American Medical Association, in which it was recommended that the president be authorized to tender an invitation to the American Medical Association to send a visiting delegation to the next meeting at Chicago. The recommendation was adopted.

Reports were also read from the Committee on the adoption of the metric system and from the Committee on Transportation.

Various amendments to the by-laws were then acted on and adopted, as follows: Chap. viii, Art. ii, a list of the names of the proposed candidates is to be posted in the meeting hall at the beginning of a session. Chap. ix, Art. iv, now permits also the proposition of amendments preceding the sessions of the different Sections. In Chap. vii, the word appointed, occurring in Articles II and III, was changed to elected. A communication received from Mr. A. Snyder, in reference to membership, was referred to the Committee on Membership.

A committee from the Section on Commercial Interests reported a recommendation "that the proprietors put the A. P. A. plan in force promptly and omit the delay in the submission of it to the retailers for approval." After some discussion, this was adopted.

Mr. Bassett reported from the same Section a request to appropriate sufficient money for defraying the expenses of the Committee visiting the National Wholesale Druggists' Association at its next meeting, and moved that the amount of such appropriation be subject to the approval of the Council. Carried.

On motion of Mr. Martin a sufficient sum was appropriated to pay for the prizes awarded by the Section on Scientific Papers.

A motion of Mr. Sheppard was adopted, instructing the Council to consider the question of prizes, and report thereon at the next annual meeting; this action, however, not to militate against any arrangements for the presentation of prizes next year if in accord with the vote of the Association in 1887.

On motion of Prof. Good it was *Resolved*, That the American Pharmaceutical Association desires to record its appreciation of the ethical position taken by the American Medical Association at its last meeting in its efforts to discourage the use of secret remedies and traffic in nostrums.

Resolutions of thanks to the local secretary and the various committees were offered by M. Alexander, and adopted.

Standing and in silence the association adopted resolutions of sympathy at

the sudden illness of Professor Bedford. In another place we record his death, which occurred on the Wednesday following.

After installing the newly-elected officers, and reading the minutes of the last session, the Association finally adjourned to meet next year in Chicago, on the third Tuesday of August, 1893, unless the time be changed by the Council.

The date for the meeting of the Seventh International Pharmaceutical Congress at Chicago has been fixed for the fourth Tuesday of August, 1893.

During the days of their stay at the Profile House the members visited the places of interest in the neighborhood. Within easy walking distance is the "profile," a stone face formed on a spur of the mountain by three ledges of granite, nearly forty feet in height, and overlooking the placid Profile Lake, twelve hundred feet beneath it; and in the opposite direction Echo Lake. The Basin, Pool and Flume are distant four and six miles, and a visit to Sugar Hill requires a drive of about sixteen miles. Ascents of Mounts Lafayette and Cannon were also made by a number of the party. On three evenings readings were given by Professor Churchill, and music had been provided in the lobby or the parlors of the hotel afternoons and evenings.

On Tuesday morning, July 19, about one-half of the party left by rail at 7.30, visited Mount Washington, took dinner at the Summit House and then returned, passing the evening and night at the Crawford House. The remainder of the party started about three hours later, passed the night at Fabyan's, and reached the Crawford House on Wednesday morning. From here the ascent of Mount Willard was made, from the summit of which a grand view is had of the upper Saco Valley. Dinner was provided at the Crawford House, the excursionists being the guests of Vermont druggists, Wells, Richardson & Co., Burlington, and after dinner the party left by rail, some returning to Boston, but the large majority, accepting the invitation extended by Maine, proceeded to Portland, arriving there early in the evening, and put up at the Falmouth, United States, Preble and other hotels. At the former of these an informal reception was held, at which many of the pharmacists, druggists, physicians and other citizens of Portland were present. The pharmacists of the city, joined by the Board of Trade and others, provided a carriage ride for Thursday morning, thus affording the visitors an opportunity for seeing the principal portions of the city and some of the suburbs. The drive terminated at a steamboat landing, where a steamer was in waiting to convey the visitors and their hosts on an excursion through the harbor and a part of Casco Bay, which is studded with a large number of islands, big and little. Finally, Long Island was reached, where a clam-bake was in progress and dinner was served. The return trip to the city was made in time to take the evening trains for Boston. But many preferred remaining in the hospitable city over night, while another large party secured state-rooms aboard the steamer *Portland* for a sea voyage to Boston during the evening and night. The latter city, which had been the gathering point of the party nearly two weeks earlier, became now the dividing point on the homeward trips.

Aside from the work done at the sessions, the meeting was a memorable one for the historical places visited, for the sublime scenery beheld, for its social features and for the unbounded hospitality tendered by Massachusetts, New Hampshire, Vermont and Maine. But a shadow was cast at its close by the sudden removal of one of the party from among the living.

OBITUARY.

Joseph C. Turnpenny, deceased at his residence, No. 813 Spruce Street, Philadelphia, June 15, 1892, in the 80th year of his age. Joseph was the youngest of the four children of John and Tabitha Turnpenny. He was born in Sheffield, England, September 28, 1812. His father was a merchant in Sheffield. Joseph and his elder brother Frederick were the only children who lived to come to the United States, about the year 1814. Frederick studied medicine, and had the degree of M. D. conferred on him by the University of Pennsylvania; he deceased in 1840. Joseph received his early education at the School of the Society of Friends on Pine Street near Second Street. In 1828 he was apprenticed to Henry M. Zollickoffer, whose store was at Sixth and Pine Streets, to learn the business of an apothecary. He graduated in the class of 1833 at the Philadelphia College of Pharmacy, and went into business at the N. E. corner of 10th and Spruce Streets, in 1834. In 1864 he retired from business and was succeeded by Samuel S. Bunting. He was elected to membership in this College in 1834, and served the college as its Treasurer for a number of years (1844 to 1853), and also as a member of its Board of Trustees. His name is attached as author, or as joint-author with that of the late Aug. Duhamel, or with Wm. Procter to several papers on practical pharmaceutical subjects, which were published in the 14th and 17th volumes of this journal.

In November, 1853, he married Elizabeth Richardson, daughter of John and Sarah Richardson, of New Castle County, Delaware.

As a member of the religious society of Friends he maintained through life their customs of dress and address. For many years he was an active member of many of the charitable institutions of this city, and devoted much time to the alleviation of the necessities of the poor and suffering. His long service in the Board of Managers of the Pennsylvania Hospital terminated only with his life. Affable in his disposition and courteous in his address, carefully correct in all of his business transactions, he leaves an honored name on the roll of the deceased members of this College. His health was much impaired several years ago by an attack of pneumonia, and to that trouble he finally succumbed. His wife, who had been an invalid for some time, deceased a few days after her husband. They leave no children.

C. B.

Peter Wendover Bedford, Ph.G., Emeritus Professor of Pharmacy of the New York College of Pharmacy, died suddenly at the Profile House, N. H., July 20, in the fifty-sixth year of his age. He was born August 1, 1836, in Johnsville, Dutchess Co., N. Y., and was the eldest of eight children. He received his early education at a private school at Mount Vernon, and when only twelve years old became an apprentice in a pharmacy on Bleecker Street, New York, and subsequently while engaged with Mr. Ewen McIntyre, attended lectures at the New York College of Pharmacy, from which institution he graduated in 1858. Shortly afterwards he went into business at 769 Sixth Avenue, New York, and also conducted a branch store at Mount Vernon, N. Y. Soon after becoming a member of the New York College of Pharmacy, he was chosen secretary in 1860, and later on one of the trustees. From about 1865 he had occasionally given instruction and sometimes lectured to members of the classes of that College, and in 1873 he was elected professor of pharmacy

which position he held until 1891. His connection with the American Pharmaceutical Association dates from the year 1859, and in the following year he contributed to its Proceedings a paper on the depreciation of Smyrna opium in medicinal value, which marks the beginning of his literary career. Having given up his retail stores in 1870, he became connected with wholesale houses, first with Tarrant & Co., and subsequently with Lazell, Marsh & Gardner, until 1883. The excellent opportunities afforded him through this connection widened his views on commercial subjects, and his writings became more varied and more frequent, more especially his contributions to the *Druggists' Circular*, then edited by Dr. Newton, and his subsequent papers for the *Pharmaceutical Record*, the editorship and management of which he undertook in 1883, at the same time changing its former title of "Martin's Chemists' and Druggists' Bulletin." It was due mainly to his energy that the New York State Pharmaceutical Association was organized in 1879; Prof. Bedford was complimented by being elected its first president. In 1884, he became a member of the New York City Board of Pharmacy, and was elected its president, continuing in service until the time of his death. In the American Pharmaceutical Association, besides having served on many committees, he was corresponding secretary from 1860 to 1862, and again from 1863 to 1866, when that office was discontinued, he having served as recording secretary at the meeting in Philadelphia in 1862, and at the first session of the Baltimore meeting in 1863. He was the first local secretary elected by the association and acted as such for the New York meeting in 1867. In 1881, at the Kansas City meeting, he was called to the presidential chair. He was very rarely absent from the annual meetings of this association during a period of thirty-two years.

Professor Bedford was, verily, a busy man. His genial disposition secured for him a large circle of friends; and it will, indeed, be impossible to fill his place in the varied spheres alluded to above. Though retired as a teacher, he retained until the last his interest in the promotion of pharmacy, and his devotion to the institutions and bodies with which he had been connected during his busy life. For some time past he had been aware of some affection of the heart; but during the trip on the steamer *Puritan* from New York to Boston, he appeared to be in his usual good health and spirits. He was somewhat indisposed on the journey to the White Mountains, but was taken seriously ill on the night of July 16, his condition being aggravated by apoplexy on Monday, until he died on the following Wednesday. His body was taken to his home in New York, where the funeral services were held on Friday, July 22.

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ON THE PREPARATION OF GLYCERIN SUPPOSITORIES.

BY PROFESSOR JOSEPH P. REMINGTON, PH.M.

From the Proceedings of the American Pharmaceutical Association, July 16.

Glycerin suppositories are now very largely manufactured and, as is well known, they are used for producing a gentle laxative effect upon the bowels. The problem which has confronted the pharmacist has been to combine a comparatively large quantity of glycerin with an inert body, capable of giving the requisite solidity to the mass, and at the same time be soft enough to liquefy in the rectum. Very many formulas have been in existence, but in the writer's opinion, none give as much satisfaction as the following :

GLYCERIN SUPPOSITORIES.

Sodium carbonate,	40 gr.
Stearic acid,	80 "
Glycerin,	1,080 "

Dissolve the sodium carbonate in the glycerin, add the stearic acid, heat carefully (preferably by the use of a water-bath) until effervescence ceases ; the solution is then poured into a suppository mould to make twelve suppositories. There is no necessity for cooling the moulds with ice, although there is no objection to this in warm weather. As each suppository contains about ninety per cent. of glycerin, they must be protected from the action of moist air, which has a tendency to liquefy them. Several expedients are resorted to. Each one may be wrapped in tin-foil, or quickly dipped in melted paraffin ; or each one enclosed in a small glass vial without a shoulder and made for the purpose of holding one suppository.

ON FLUID EXTRACTS OF ERYTHROXYLON AND CINCHONA.

BY PROFESSOR JOSEPH P. REMINGTON, PH.M.

From the Proceedings of the American Pharmaceutical Association, July 16.

During the past winter the writer has been engaged in examining practically the various menstrua for the official fluid extracts and the results of these labors may be summarized as follows: The menstruum for Fluid Extract of Erythroxylon in the present Pharmacopœia contains more alcohol than is necessary; the best results were obtained from menstrua made by mixing one part of alcohol with two parts of water, both by volume. This made a fluid extract in which the very slight precipitate was found to be of inert matter.

In the case of the Fluid Extract of Cinchona, the menstruum which yields the best results was one which was composed of four parts of alcohol and one of glycerin, both by volume, finishing the percolation with a mixture of four parts alcohol and one of water, both by volume.

This menstruum yields a fluid extract, which though exposed for six months to a lower temperature than that prevailing at the time of its percolation, has not produced any precipitate whatever.

ANDROMEDA MARIANA.

BY ANDREW W. DOWD, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.
No. 114.

This shrub is commonly called "stagger bush." It belongs to the natural order of Ericaceæ and grows in low, sandy places, throughout New Jersey and southward near the coast. The leaves are said to be poisonous to lambs and calves.

A proximate analysis of the leaves yielded the following results:

	Per Cent.
Moisture,	2.16
Ash,	5.25

Extracted by petroleum ether:

	Per Cent.
Volatile oil, . . . . .	.034
Fat,	0.320
Wax and caoutchouc,	2.226
" Stronger ether,	3.82
" Absolute alcohol,	18.70

	Per Cent.	Per Cent.
Extracted by Water :		
Mucilage,	1'35	} 12'28
Dextrin,	2'98	
Glucose,	3'83	
Undetermined,	4'12	
" Diluted alkali :		
Pectin and albuminoids,	2'73	} 8'55
Undetermined,	5'82	
" Acidulated water,		4'38
" Boiling water :		
Chiefly starch,		1'99
Lignin,		3'18
Incrusting matter,		5'86
Cellulose,		31'25
Total,		100'00

The ethereal extract consisted largely of chlorophyll and resin.

The alcoholic extract contained red coloring matter, tannin and resin. It also contained a sweet principle of a glucosidal character.

This was probably the *andromedotoxin* so prevalent in the poisonous plants belonging to this natural order. A larger quantity was prepared by extracting another portion of the leaves with ninety-five per cent. alcohol, concentrating, and pouring the solution into acidulated water. After filtering, the clear filtrate was agitated with ether which removed the sweet principle, and yielded it as an amorphous mass on the evaporation of the ether. Attempts were made to purify this compound, and obtain it in a crystalline condition by dissolving in water and again agitating with ether, but decomposition occurred to such an extent as to render the result of too small an amount to be of value. The sweet taste likewise disappeared with each purification.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

Mercurial soaps.—The direct saponification of fats and oils by mercuric oxide not being feasible because of the reduction of the oxide to metal, and the precipitation of mercuric chloride solution by soap solution yielding a product from which the excess of mercuric chloride can only be removed by repeatedly boiling with fresh portions of water during which separation of metallic mercury also occurs, Mr. C. Micko was compelled to first separate the fatty acids from

the fats and oils and then by warming cause these to react with yellow oxide of mercury; the products were entirely satisfactory for medicinal use. The fats were saponified in the usual manner and the fatty acids liberated from the alkali-soaps by adding hydrochloric acid; after boiling the fatty acids with several portions of water to remove mineral acid, they are transferred to a capsule and dried in an air-bath. To determine the necessary mercuric oxide about two grams of the acid are titrated with $\frac{n}{2}$ alkali, using phenolphthalein as indicator (for most purposes the oxide necessary can be calculated if the average molecular weight of the fatty acids is known, this requiring 108 parts mercuric oxide). The acids and oxide are rubbed together; then a little water added and heated carefully on a water-bath until the color of the oxide disappears (if the acids separated from tallow be used the operation must be completed by finally heating carefully on an oil-bath); to obtain good results excessive heating must be avoided. The following table gives (1) the source, (2) saponification-equivalent, (3) average molecular weight, and (4) iodine absorption of the fatty acids; (5) percentage of HgO, (6) color, and (7) consistence of the resulting soaps.

1	2	3	4	5	6	7
Sesame oil, . . .	198.0	283.3	110.5	28.26	yellowish	of cold cream
Olive oil, . . .	200.3	280.1	88.5	28.48	yellow	"
Lard, . . .	202.0	277.8	65.0	28.69	almost white	firmer
Palm oil, . . .	207.0	271.0	53.4	29.18	orange to brown	"
Beef suet, . . .	200.0	280.5	38.5	28.45	almost white	of lead plaster
Cocoanut oil, . .	276.3	205.3	8.6	35.70	"	waxy
Stearic acid, . .	205.7	272.7	1.7	29.05	"	friable

The consistency of the soaps, also their susceptibility to decomposition by heat, follow the variation in the iodine-absorption of the fatty acids; while the soap made from sesame oil-acids is soft so that it can be drawn into threads, it is most easily decomposed by heat; commercial stearic acid yields a soap so hard that it can be powdered and used in this condition. These soaps are much more permanent than the commercial oleates (solution of true oleate in excess of oleic acid); for the preparation of pastes and ointments the soap made from olive oil is most desirable, while for plasters the soaps from beef suet or cocoanut oil, owing to their firmer con-

sistency, are to be preferred. For these purposes it is only necessary to soften the scaps on a water-bath and then incorporate the other ingredients.—*Oesterr. Ztschr. f. Pharm.*, 1892, 354 and 372.

Ferrum reductum.—An examination of commercial samples failing to find a single specimen meeting the requirements of the Pharm. Austr. (98.8 per cent. Fe) caused an inquiry to be made regarding the difficulty. It was found that if the hydrogen, generated from zinc and sulphuric acid, was not purified before acting upon the heated ferric oxide, three hours' exposure produced a preparation of grayish black color which dissolved in dilute sulphuric acid only after prolonged boiling, and was found to contain only 58 per cent. Fe. By purifying the hydrogen, passing it successively through concentrated permanganate of potassium solution, lead acetate solution, sulphuric acid, and finally over fused calcium chloride, three hours' exposure sufficed to reduce the ferric oxide and there was obtained a dark gray powder, readily and completely soluble in dilute sulphuric acid without heat and containing 99.68 per cent. Fe. It appears, therefore, that a satisfactory product necessitates the use of purified hydrogen.—T. Appel, *Oesterr. Ztschr. f. Pharm.*, 1892, 395.

Cantharidin and cantharidal cerate.—The manufacture of cantharidin by the following improved process has given good results during the past eleven years; by it the free and combined cantharidin is extracted; 1000.0 moderately-fine powdered cantharides are macerated in the cold for two days with a mixture of 20.0 sulphuric acid (sp. gr. 1.838) and 1500.0 acetic ether (sp. gr. 0.902); after adding 40.0 barium carbonate the mixture is exhausted with acetic ether in an extraction apparatus. The solvent is distilled off, and the residue consisting of resin, fat and cantharidin is allowed to stand eight days to induce crystallization of the cantharidin; 200.0 petroleum-ether (sp. gr. 0.740) are then added and gentle heat is applied to facilitate solution of the fat; the solution is filtered off, the cantharidin washed with petroleum-ether and recrystallized from 90 per cent. alcohol. The product is almost white and sufficiently pure for the manufacture of plasters, etc.; should the cantharidin be needed purer for other purposes, it must be recrystallized from acetic ether with the addition of animal charcoal. The following yields have been obtained: *Lytta vesicatoria*, 0.3–0.45 per cent.; *Epicauta Gorrhami* (a Japanese beetle), 0.45 per cent., *Mylabris Cichorii*, 0.9–1.3 per cent.

The several pharmacopœias in their formulas for making the *cantharidal cerate* extract *only* the *free* cantharidin; in the following process it is aimed to extract the *total* cantharidin; 100.0 olive oil and 525.0 yellow wax are melted and a mixture of 1.0 sulphuric acid (sp. gr. 1.838) and 10.0 alcohol (90 per cent.) uniformly mixed in; after adding 250.0 finely-powdered cantharides, the mass is allowed to stand for two hours at 60–70° C., stirring frequently; finally, an intimate mixture 2.0 barium carbonate and 6.0 alcohol (90 per cent.) is incorporated. The process has already suggested the question, “Would it not be better to add the acid mixture to the cantharides and later to add the oil and wax?”—*Pharm. Centralhalle*, 1892, 425.

Test for Cocaine.—To a small quantity of the alkaloid add 1 cc. nitric acid (sp. gr. 1.4) and evaporate to dryness on a water-bath; to the cold residue add one drop of an alcoholic potash solution (amyl instead of ethyl alcohol gives a better reaction), no change is noticed until the test is warmed again on the water-bath, when an intense violet coloration will suddenly appear. The test differs from the one obtainable with atropine, inasmuch as the violet coloration here appears in the cold and is destroyed by subsequent heating on the water-bath.—A. Kuborne, *Pharm. Centralhalle*, 1892, 411 and 432.

In the manufacture of Salicylic Acid the distillation of the crude acid with superheated steam is attended by considerable loss. Dr. P. W. Hofmann has patented a process by which the distillation becomes unnecessary. To the crude lye is added some stannous chloride solution; this precipitates a dark oily mass, containing the objectionable impurities, while the supernatant liquid is as clear as water; the addition of hydrochloric acid then causes the precipitation of pure salicylic acid, which is freed from hydrochloric acid by washing and the use of centrifugals.—*Pharm. Centralhalle*, 1892, 412.

Creasote pills.—The dispensing of these pills has caused some difficulty on account of a suitable excipient and the volatility of the remedy. The following method of procedure is pronounced very satisfactory; it depends upon making first what is called a “creasote emulsion” (50 per cent.) from gelatin 5.50, distilled water 12.00, sugar 2.50 and creasote 20.00; the emulsion is preserved in tight-fitting glass-stoppered bottles. In making pills,

the corresponding quantity of the emulsion is taken and made into a mass by the addition of a little powdered liquorice and althæa. The emulsion should be taken from the bottle with a horn spatula since iron discolours it; the pill mass, however, can be removed from the mortar with an iron spatula.—J. Norberto, Jr., *Pharm. Post*, 1892, 817.

Test paper for sulphurous acid.—2 gm. wheat starch are made into a thin paste with 100 cc. boiling water and a solution of 0.2 gm. potassium iodate in 5 cc. water added; a good quality of filtering paper is impregnated with this solution, allowed to dry, cut into small strips and carefully preserved in glass-stoppered bottles. This paper when moistened will indicate very minute quantities of free sulphurous acid by the appearance of a blue color (the sulphurous acid liberates iodine from the iodate and this in turn reacts upon the starch, producing blue iodide of starch). Sulphites will also yield the blue color if the paper be first moistened with a diluted hydrochloric acid (1 : 100); the hydrochloric acid itself has no action upon the paper, being used to liberate small quantities of the sulphurous acid.—*Südd. Apotheker Ztg.*, 1892, 219.

Tooth ache drops.—(I) Oils of cajeput and cloves, each, 1.0; chloroform, 2.0. (II) Camphor and chloral hydrate each, 2.0; spirit of peppermint, 1.0. (III) Tincture of cannabis indica, oil of cloves and chloroform, each, 2.0. (IV) Tinct. opii crocat., olei menth. pip., spir. æther., aa 2.0.

Tooth soaps, hard.—Precipitated chalk, 8.0, carmine, 0.2, dissolved in water of ammonia, powdered soap, 20.0; peppermint oil, 0.5; alcohol, 3.0; after moulding it is to be dried. *Soft.*—Precipitated chalk, 20.0, carmine, 0.2 dissolved in water of ammonia, powdered soap, 5.0; peppermint oil, 0.5; syrup, glycerin, and alcohol of each sufficient. *Liquid.*—Soap liniment, 100.0, tincture of myrrh and glycerin, each, 20.0; oil of peppermint, 0.5; color to suit.

Tooth balsam.—Extract of opium, camphor and Peruvian balsam, each, 1.0; powdered mastich, 2.0; chloroform, 20.0; to be applied on cotton.

Tooth cement.—Pure zinc oxide, 98.0; magnesia, 2.0; glacial phosphoric acid, q. s.; the powders are to be mixed in a warm mortar, with sufficient melted acid to make a paste; it is to be used at once as it rapidly hardens.

Tooth wax.—Wax, 30.0; Venetian turpentine, 12.0; powdered mastich, 5.0; powdered opium, 3.0; chloral hydrate, 2.5.

Tooth wash.—Tannin, 5.0; tincture of iodine and tincture of myrrh, each, 2.5; potassium iodide, 1.0; rose water, 180.0; a teaspoonful in a glassful of warm water used as a wash will prevent decay and loosening of the teeth.

Antiseptic Tooth wash (Cordin).—Saccharin, 1.0; sodium bicarbonate, 0.5; alcohol, 100.0; oil of peppermint, gtt. xi.—*Apotheker Ztg.*, 1892, 347.

Oxychinaseptol (*diaphtherin*).—The properties published in *Am. Journ. of Pharmacy*, 1892, 374, are now supplemented as follows: Recrystallized from water it forms amber-yellow, transparent, hexagonal crystals, which powdered are soluble at least in an equal weight of water; melting point 85° C.; not decomposed until heated to 180–220° when phenol distils over; between 220° and 250° a mixture of oxychinoline and phenol distils, and between 250–269° C. oxychinoline with traces only of phenol passes over; the aqueous solution with ferric chloride occasions a blue green color destroyed by hydrochloric acid. Excess of sodium carbonate causes a separation of oxychinoline while phenol is found in solution. It is quite soluble in dilute alcohol, less so in strong alcohol.—*Pharm. Ztg.*, 1892, 429.

Lanolin milk.—20.0 powdered soap, 10.0 powdered borax, 70.0 water, 30.0 cocoanut oil, 70.0 hydrated lanolin are triturated together for at least 10 minutes and 800.0 warm rose-water (40° C.) gradually added; after agitation the preparation is perfumed with the oils of bergamot and orange flower, each, gtt. x; rose, gtt. v, and wintergreen gtt. i.—E. Dieterich, *Pharm. Ztg.*, 1892, 429.

Thiosalicylic acid is recommended to be used medicinally for the same purposes as salicylic acid; patents have been applied for a process of preparing it from anthranilic acid by converting this into *o*-diazobenzoic acid, treating with hydrogen sulphide, then with sodium carbonate or hydrate, and supersaturating with hydrochloric or sulphuric acid. On oxidation it gives at once *ortho-sulphobenzoic acid* free from isomers and, therefore, important in the manufacture of the sweet substance, saccharin.—Prof. C. Graebe, *Apotheker Ztg.*, 1892, 359.

Sarsaparilla constituents.—According to Prof. Kobert's researches there are three glucosides present. *Parillin* ($C_{26}H_{44}O_{10} + 2\frac{1}{2} H_2O$), insoluble in water; *saponin* (sarsaparill-saponin) $5(C_{20}H_{32}O_{10} + 2\frac{1}{2} H_2O)$ soluble in water; *sarsasaponin* $12(C_{22}H_{36}O_{10} + 2H_2O)$ easily soluble in water and the *most poisonous* of the constituents. These substances injected into the blood, the red corpuscles are destroyed more rapidly than by most of the known poisons; they have action similar to the quillaia glucosides, but are weaker. These constituents are not absorbed into the system when administered, except by injured membranes, hence the questionable value of sarsaparilla. Kobert denounces the simultaneous administration of mercurials and sarsaparilla, since the lesions of the intestinal membranes frequently caused by the former may allow of the absorption of the poisonous sarsaparilla glucosides.—*Rundschau*, 1892, 611.

A new anæsthetic, similar to cocaine, has been found in *eugenol-acetamide*. By successive reactions eugenol is changed into eugenol-sodium, eugenol-acetic acid, ethyl eugenol-acetate and eugenol-acetamide. Crystallized from water it forms lustrous scales, from alcohol delicate needles melting at $110^{\circ} C$. Applied in the form of a fine powder, it produces local anæsthesia, without any caustic action; this effect, in conjunction with the strong antiseptic property of eugenol-acetic acid, speaks for the new compound securing a place in the treatment of wounds. Patents for its preparation have been applied for by the Farbwerken.—*Pharm. Centralhalle*, 1892, 441.

Jalapin.—The examination of the resin of so-called jalap stalks (root of *Ipomœa orizabensis*, *Ledanois*), has been continued under the supervision of Prof. Poleck, who regards this resin as probably identical with tampicin of *Ipomœa simulans*, *Hanbury*, and confirms its identity with scammonin. The formula, $C_{34}H_{56}O_{16}$, determined by W. Mayer in 1855, is confirmed; also the various derivatives, except jalapinol, which had also been noticed by Samelson in 1883, but which could not be isolated by Poleck. Jalapic acid is $H_2C_{17}H_{25}O_9$, and jalapinolic acid $HC_{16}H_{29}O_3$ —*Oest. Ztschr. f. Pharm.*, 1892, 391, 423 and 447.

The name *jalapin* should be discarded in favor of *orizabin*, the former name being improper and misleading.

Camphor for hypodermic injection is dissolved by Dr. Rosauer in warm paraffin oil.—*Zeitschr. f. Ther.*

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

Ozone as a therapeutic agent.—In a paper read recently before the French Society of Electrotherapy, Drs. Larat and Gautier prove that the clinical results observed from ozone as a therapeutic agent are far from being constant and are even in contradiction with the physiological experiences.—*Rev. Internat. de Bibl. Méd.*, July 25, 1892.

Decomposition of sulphurous acid by charcoal.—Berthelot has shown that at a red heat the reaction of the two bodies results in the production of carbonic oxide, carbon oxysulphide and carbon disulphide. Scheurer-Kestner (*Compt. rend.*, cxiv, 296) ascertained that at a white heat the reaction proceeds according to the equation $2\text{SO}_2 + 3\text{C} = 2\text{CO} + \text{CO}_2 + 2\text{S}$.

Anhydrous crystallized sulphates have been prepared by P. Klobb (*Compt. rend.*, cxiv, 836) by mixing the metallic sulphate with excess of ammonium sulphate, and heating the mixture in a partly covered crucible until the latter salt has been completely expelled, but not increasing the heat to the decomposition of the former. In this manner ZnSO_4 has been prepared in colorless octahedra; CuSO_4 in gray needles; CoSO_4 in purplish red, and NiSO_4 in yellowish green octahedra.

Preparation of pure strontium salts.—Barthe and Falières suggest (*Bull. Soc. Chim.*, 3 ser., vii, 104) the following process: Dissolve strontianite or strontium sulphide in dilute hydrochloric acid, precipitate Fe and Al by ammonia, add excess of sulphuric acid, wash the precipitate by decantation until Ca has been completely removed, pour upon the precipitate excess of ammonium carbonate solution, agitate occasionally during two days, and then thoroughly wash the mixed strontium and barium sulphates and carbonates; treat this residue with dilute hydrochloric acid, filter after 24 hours, add to each liter of liquid 200 gm. sulphuric acid, spec. grav. 1.17, digest for several hours with 2 or 3 gm. of freshly precipitated strontium sulphate, which will be dissolved by the strongly acid liquid and precipitate any barium still in solution; then filter, evaporate to dryness, again dissolve in water and crystallize. Thus prepared the salt shows only the lines of strontium in the spectro-scope.

Chloride of gold and sodium is recommended by Dr. Boubila as a

remedy in progressive general paralysis, augmenting the chances of resistance and retarding further development during the period of decline. It is given morning and evening in doses of 2 milligrams in a potion of 120 gm.; after fifteen days the dose is increased by 2 mgm., until 1 centigram is reached, which is continued for a fortnight. The treatment is then discontinued for a month, after which time it is resumed in the same manner. Under the conditions named these large doses are borne without inconvenience.—*Rev. internat. de Bibl. méd.*, July 25, 1892.

Calcium bisulphite is recommended by Henry Berg (*Eira, Stockholm*, xvi, through *Rev. internat. de Bibl. méd.*, 1892, p. 222) as a valuable antiseptic, which does not possess toxic properties, destroys infectious germs quickly and surely, is not caustic, does not alter the healthy tissues, and is prepared without difficulty and at a low cost in colorless solution, having a characteristic and easily recognized odor.

Antisepsis during epidemics.—E. Vallin in *Rev. d'hygiène*, February, 1892, directs attention to the necessity of frequent and prolonged antiseptic applications to the nasal cavities, the mouth and the throat, where morbid germs would be apt to lodge and multiply. Cinnamon water, anise water or a similar vehicle may be used for this purpose, to which may be added naphthol, salol, phenol or other antiseptic agent, which is not poisonous and does not attack the enamel of the teeth; for the nose a 3 per cent. solution of boric acid is a good application. To be effective these washes should be applied several times a day.

Synthesis of tartaric acid.—P. Genvresse (*Compt. rend.*, cxiv, 555) treated glyoxylic acid, $\text{COH} \cdot \text{CO}_2\text{H}$, with zinc powder and acetic acid, heating finally on the water-bath, whereby it was converted into racemic acid.

The fruit of Prunus Laurocerasus, according to Camille Vincent and Delachanal (*Compt. rend.*, cxiv, 486), contains mannit and sorbit. The bruised cherries were allowed to ferment, the liquid treated with lead acetate, freed from lead and concentrated to a syrup, from which most of the mannit crystallized, more being precipitated by the addition of alcohol. The remaining liquid, by a complicated process, yielded sorbit identical with that obtained from mountain ash berries.

Olive oil.—Of 12 samples of olive oil examined at Montpellier in 1891, 4 were found to be pure, 4 to be mixtures with other oils, and 4 to be olive oil in name only. In the same report (*Rev. internat. d. Falsif.*, May, 1892) it is stated that the average quality of wine as well as milk has slightly improved during the same year.

Estimation of caffeine in tea.—After examining a number of methods for the assay of tea, many of which yield the alkaloid more or less colored, Cazeneuve and Biétrix recommend (*Répert. de Phar.*, May) the following, which yields the maximum amount of caffeine almost colorless: The alkaloid is liberated by lime, extracted with chloroform, the chloroformic solution evaporated, the residue treated with boiling water in the presence of a little animal charcoal, and the filtrate concentrated upon the water-bath.

Flavoring of tea.—Java teas, which are of no value for exportation, are being improved in flavor by the flowers of *Jasminum Sambac*, Aiton, *Aglaia odorata*, Lour., and *Gardenia pictorum*, Hassk. According to *Rev. internat. des Falsif.*, an industry has been started at Cheribon, Java, to prepare such teas in imitation of Chinese tea.

Dose of digitalis.—In a paper read before the Académie royale de Médecine de Belgique (*Procès-verbal*, April, 1892), Dr. Masius shows that in doses generally considered as hypertoxic, digitalis may be taken not only without inconvenience, but that such massive doses will surely and rapidly prevent the dangers arising from cardiac weakness and from a high temperature. Administered in the dose of 4 grams in twenty-four hours, digitalis acts as a heart tonic, improves its energy, regulates pulsation and, therefore, combats venous stagnation, œdema, dyspnœa, symptoms resulting from cardiac insufficiency; it reduces the febrile temperature, bringing it back to the normal, and in the absence of fever exerts no effect upon the temperature. The paralytic action of the heart is not to be feared, though such large doses of digitalis neither arrest pneumonia nor shorten its course, as has been stated to be done by Prof. Petresco. (See Amer. Jour. Phar., July, 1892, p. 367.)

Euphorbia antiquorum, Linné.—J. Santos Fernandez of Havana (*Revista de Cienc. med.*, April) has observed sixteen cases of inflammation of the cornea and conjunctiva resulting from having come into contact with the milk juice of this plant; the appearance of the organs was similar to that produced by burned lime or boiling

water. The treatment was similar to that followed ordinarily for this kind of lesions. The plant is originally indigenous to India, where it and its milk juice are employed medicinally.

Menthol in pruriginous skin diseases is prescribed by Dr. P. Colombini (*Gior. ital. d. mal. ven. e d. pelle*, 1892, through *Rev. internat. de Bibl. méd.*) in one of the following forms, according to the nature of the case:

Spirit: Menthol, 5 to 10; alcohol, 100.

Oil: Menthol, 10; expressed almond oil, 100.

Ointment: Zinc oxide, 25; starch, 25; menthol, 0.50 to 3; petrolatum, 50.

Dusting powder: Zinc oxide, 10; bismuth subnitrate, 10; menthol, 1 to 3; starch, 30.

Tæniifuge.—In the case of a child troubled with *Tænia inermis*, pumpkin seed and pelletierine tannate afforded no relief; but the parasite was promptly expelled by an emulsion consisting of oleoresin of male fern, 3; tincture of vanilla, 3; syrup of turpentine, 25; water, 25, and gum arabic, 2 gm. The emulsion mixed with an equal quantity of milk was taken in one dose, and two hours later castor oil, 15 gm., was given.

The use of milk in artificial alimentation of infants is the subject of an essay recently presented to the Paris Academy of Medicine by Henry Drouet, whose observations lead him to the following conclusions:

(1) While some infants readily digest unboiled milk, the digestibility of milk is not in the least diminished, in the large majority of cases, by boiling.

(2) The nutritive power of boiled milk is to a large extent sufficient for the needs of infants.

(3) Boiled milk is preserved unaltered for a longer time than unboiled milk.

(4) Milk is often the vehicle of certain contagious disease-germs.

(5) Among these the germs of tuberculosis are most frequent.

(6) Contagion from that source is prevented by boiling the milk.

(7) It is absolutely indicated that milk intended for alimentation be boiled.

Constituents of leaves.—A. Étard (*Comp. rend.*, cxiv) has investigated some leaf-constituents accompanying chlorophyll. The

extract obtained with carbon disulphide was treated with alcohol and the insoluble portion recrystallized from benzol and afterward from acetic ether. The leaves of *Vitis vinifera* yielded colorless *vitol*, $C_{17}H_{34}O$, melting at 74° and boiling near 300° C. *Medicagol*, $C_{20}H_{42}O$, from *Medicago sativa*, melts at 80° and boils at 395° . *Bryonan*, $C_{20}H_{42}$, from the leaves of *Bryonia dioica*, melts at 69° and boils at 400° . The alcohol solution, obtained as stated above from grape vine leaves, contained fat acids and *vitoglycol*, $C_{23}H_{44}O_2$, the latter soluble in ether in the presence of alkalies.

This method may be used for separating the constituents into different groups. The extract obtained with carbon disulphide, on treatment with alcohol leaves glycerides and the higher alcohols and glycols behind, while alkaloids, alcohols, glycols, chlorophyll and acids are dissolved, the latter being separated from the other compounds by means of weak alkali solution. On treating the leaves, exhausted with CS_2 with hot alcohol, an extract is obtained which may again be separated into different groups of constituents by means of cold alcohol and by ether.

Artificial coloration of flowers.—The new industry of coloring flowers (pinks) green has been the subject of study by G. Planchon, who, in May last, reported his results to the Paris Conseil d'hygiène. It appears that the florists finding coloring matters frequently not rising in the tissues, overcome the difficulty by resorting to immersion. Basic coloring matters do not color flowers by ascension, but acid coloring matters generally are adapted for this purpose. The rapidity of ascension varies considerably; green acids rise quite rapidly, while blue, and particularly brown, acids penetrate only slowly to the flower. To color flowers by immersion, they are simply plunged into a solution of the appropriate dye stuff. Watery solutions have usually no effect, owing to the secretion present upon the surface of most petals; but by means of alcoholic solutions the flowers become dyed after the evaporation of the alcohol. Such flowers, however, are less handsome in appearance than those colored by ascension. Many of the coloring matters that may be employed for the purpose indicated are harmless, but even of the poisonous kinds a very small quantity only is usually required, too little to be hurtful.

Coloring matters in distilled waters.—L. Viron has observed (*Compt. rend.*, cxiv, 179) the formation of coloring matters in dis-

tilled medicinal waters, and isolated from green orange flower water three pigments, viz: one soluble in water with violet color, turning brown on exposure, secreted by a variety of *Micrococcus cyaneus*; one dissolving in alcohol with yellow color, secreted by *Bacillus aurantii*; and the third insoluble in alcohols, but dissolving in water with a green color. In some waters an organism was found producing a yellowish green fluorescence.

VOLATILE ORGANIC MATTER IN POTABLE WATER AND A SIMPLE METHOD OF ESTIMATING DIS- SOLVED FIXED AND VOLATILE ORGANIC MATTER IN WATER.¹

BY W. C. YOUNG.

To determine the total organic matter, 1 litre of water, to which 0.5 gram of dried and ignited sodium carbonate is added, is distilled in a conical iron still of about 2 litres capacity, attached to a tin worm-condenser. The distillate is received in a graduated measure and when 970 cc. has been collected, the source of heat is removed, the still disconnected, the contents and washings placed in a platinum basin, and evaporated to dryness on a water-bath. The residue is then dissolved in a little pure distilled water, filtered through an asbestos plug into a platinum basin, dried on a water-bath, and subsequently heated for an hour in an air-bath at 150°. After cooling in a desiccator, the basin and contents are weighed. The residue is then ignited at a low temperature, cooled, and weighed and the loss noted. The ignited residue is dissolved in water, excess of sulphuric acid added, and then standard solution of potassium permanganate (1 cc. = 0.0001 gram O) until the color remains permanent after five minutes. The weight of oxygen lost, thus ascertained, is deducted from the loss on ignition, and the difference is the organic matter. To determine the fixed organic matter, the same course is followed, except that the sodium carbonate is not added until the concentrated water is transferred from the iron still to a platinum basin. To determine the volatile organic matter, the distillate from the last-mentioned process is placed in the still, together with 0.5 gram of sodium carbonate, and distilled until about 25 cc. remains in the still, afterwards proceeding as

¹ *J. Soc. Chem. Ind.*, **10**, 883; *Jour. Chem. Soc.*, 1892, 921.

before, except that it is unnecessary to ascertain the oxygen lost by ignition. The result presents about two-thirds of the total volatile organic matter present; further small quantities can be recovered from the distillate by repeating the process.

By the employment of sodium carbonate the whole of the compounds of calcium, magnesium, and iron are precipitated, and any combined ammonia in the water is volatilized. There only remains sodium chloride, alkali nitrates, and uncombined silica to interfere with the loss on ignition being accepted as a measure of the organic matter present, and neither of these compounds being present in estimating volatile organic matter, the results may be accepted as free from objection on that account. As regards sodium chloride, the burning of the organic matter is so rapid (a few seconds suffices), and the temperature so low, that none is volatilized, or if a little is lost through excessive heating, the loss can be ascertained and due correction made. As regards alkali nitrates, provision is made in the process for ascertaining and correcting for the loss of oxygen by reduction of nitrates, but it is seldom of any great importance, and has never exceeded, in ordinary drinking waters, the equivalent of 0.07 grain per gallon. The presence of nitrates assists the burning of the organic matter very materially, and in the case of very foul waters, such as sewage effluents or seriously polluted waters, which rarely contain any, the author finds it advisable to add a drop or two of solution of potassium nitrate before the final evaporation. With regard to the uncombined silica, the author has never found it present, and if it should be, he does not think heat required to burn off the organic matter is sufficiently great to cause it to decompose the sodium carbonate.

THE ACTION OF WATER UPON GLASS.

BY F. MYLIUS AND F. FORRESTER.

The authors summarize their rough researches in the following propositions, which they consider proved by their own observations and those of Pfeiffer and Kohlrausch:

(1) The solution of glass in water depends on a decomposition in which, in the first place, free alkali appears.

(2) The silica of the glass is secondarily dissolved by the free alkali.

(3) The constituents of the solution vary according to the conditions of digestion.

(4) The quantity of alkali which passes into solution from a given surface under given conditions is a measure for the attackability of the glass under these conditions.

(5) The attackability of surfaces of glass by cold water decreases at first very rapidly with the duration of digestion, and subsequently approach constant values.

(6) Different sorts of glass display a different persistence of the solution. (By this term Kohlrausch characterizes the relation of its solubility after a prolonged digestion to its original solubility.)

(7) The attackability of glass increases very rapidly with a rising temperature.

(8) The relation of the attackabilities of different kinds of glass depends on temperature.

(9) From glasses of equal attackability unequal weights may pass into solution.

(10) The attackability of good glass is decidedly decreased by a previous treatment with water.

(11) The worse a glass the less its attackability is diminished by treatment with water.

(12) The attackability of glass surfaces is modified by "weathering."

(13) After treatment with water, surfaces of glass have the property of taking up alkali from the solutions which have been formed and of giving it up again on renewed treatment with water.

(14) Potash glasses are much more soluble than soda-glasses, but the differences disappear in proportion as the glass is richer in lime.

(15) In the substance of glass vessels, which are not readily attacked by cold and hot water, the lime, alkalies and silica must bear a certain proportion to each other.

(16) Among the best known glasses plumbiferous flint glass is least soluble in water, but it is corroded at its surface and easily decomposed by acids.—*Zeit. Anal. Chemie*; *Chemical News*, August 5, p. 73.

• **Corrective for cod liver oil.**—For disguising the taste of cod liver oil 100 gm. of it are recommended to be flavored with three or four drops of a mixture consisting of the volatile oils of wintergreen 4, saffras 4, and neroli 2 parts.—*Gazz. d. Ospit.*, 1892, No. 73.

THE DETECTION AND ESTIMATION OF MINUTE QUANTITIES OF LEAD IN THE PRESENCE OF COPPER AND IRON.

BY FRANK L. TEED, D.Sc.

I propose first to refer to the detection of lead in sulphuric acid. The usual method is by dilution with water, but I found, some years ago, that by adding hydrochloric acid to the sulphuric acid, and keeping it cold, a much smaller quantity of lead could be detected than by adding water, or even by adding water and subsequently an equal volume of absolute alcohol. The lead is precipitated as chloride as a peculiar pearly opalescence. I patented this process for the purpose of removing lead from sulphuric acid, which it does perfectly, but sulphuric acid manufacturers assure me that there is no commercial value in any process that would effect such a result. Although leaving something to be desired as a patent, the process is still of use as a test on account of its delicacy. It can be applied to the detection of minute quantities of lead in organic substances. Take, for instances, a substance which is generally, I may say invariably, contaminated with lead—tartaric acid. The lead is a little difficult of detection by the ordinary process, because sulphide of lead, as we know, is more or less soluble in tartaric acid. If the tartaric acid is ignited, a large proportion of the lead is, of course, lost, but some is left, and there is sufficient in the small quantity of ash, if digested with pure sulphuric acid, to show the characteristic reaction on the subsequent addition of hydrochloric acid. While on the use of hydrochloric acid as a test for lead in sulphuric acid, I may mention that nitric acid is also a test for lead in sulphuric acid; but it is not nearly so delicate as hydrochloric acid. If to a sample of commercial sulphuric acid which is very rich (*i. e.*, very impure) in lead, nitric acid is added, the lead mainly settles out, but still, after treatment with nitric acid, lead can be detected by the addition of hydrochloric acid. Hydrochloric acid gas is insoluble in sulphuric acid, and if passed through strong sulphuric acid which is highly contaminated with lead, for an hour or more, nothing whatever happens, but if to that acid in a test tube a single drop of the solution of hydrochloric acid, or a crystal of common salt is added, the characteristic precipitate at once appears.

The main object of my paper was to draw attention to the difficulty of detecting and estimating minute quantities of lead in pres-

ence of copper and iron. There are certain temperance drinks, such as lemonade and soda water, which, in the process of manufacture, are liable to contain at least these three metallic impurities. In the case of lemonade, the lead occurs partly in the tartaric acid used, and partly comes from the use, perhaps one ought to say abuse, of lead pipes for transferring the charged solutions; and the copper comes from the copper cylinders (although tin-lined) in which the drink is charged with carbonic acid. Hence the difficulty arises of detecting a highly poisonous metal like lead, in the presence of a mildly poisonous metal like copper, and a non-poisonous metal like iron. The most delicate reaction for both lead and copper is, I believe, the precipitation as sulphides, either by sulphuretted hydrogen or ammonium sulphide. The amounts present can, of course, be estimated colorimetrically by comparison with known quantities. I find the sulphide reaction far more delicate in the case of copper than the ferro-cyanide reaction. I do not think the hundredth of a grain of copper in a gallon of liquid could be detected by means of the ferro-cyanide reaction without concentration, but ammonium sulphide would easily detect it. The objection to this reagent is that it does not distinguish between lead and copper. To effect this distinction I simply make use of the well-known fact that sulphide of copper is soluble in cyanide of potassium, whereas sulphide of lead is not. To perform a determination:—Place a measured quantity of lemonade, or other liquid, in a cylinder or white basin. Add a few cc. of ammonia and a little cyanide of potassium, then add a minute quantity of ammonium sulphide. Down comes the lead, but not the copper. Then imitate the color by known quantities of lead precipitated under similar conditions. Iron does not at all interfere with the test. If an iron salt is added to lemonade, for instance, and made alkaline with ammonia, the iron is kept in solution by the tartaric acid, and on addition of cyanide of potassium is converted into a ferro or ferri-cyanide, not precipitable by ammonium sulphide. In the case of liquids not containing tartaric acid, it is easy enough to add a little in the event of iron being present.—*The Analyst*, August, 1892, p. 142.

Santonin has been recommended in enuresis caused by irritation of the vesical sphincter, in doses of $\frac{1}{4}$ to $\frac{1}{2}$ grain, given with sugar.—*Quarterly Therap. Rev.*, July, 1892.

VOLUMETRIC DETERMINATION OF MERCURY.

BY ROD. NAMIAS.

The volumetric process to be explained is applicable only to mercuric chloride, into which every other compound must be previously converted. The nitrate must be treated with hydrochloric acid in excess, and evaporated to dryness; the mercurous salts are submitted to evaporation in presence of hydrochloric acid and of potassium chlorate.

The evaporation must be conducted with care at a temperature below that of ebullition, so as to avoid any loss of mercuric chloride by volatilization.

The process depends upon the following principle: If to a solution of mercuric chloride, slightly acidified with hydrochloric acid, we add a solution of stannous chloride, the mercuric chloride is reduced first to the mercurous state and then to metallic mercury. But whilst the first reaction is nearly instantaneous, the second takes a longer or shorter time, so much the longer as the excess of the stannous chloride is less.

If we have a reagent by which we can recognize the moment when the stannous chloride is in excess for the first reaction, and begins to produce the second, we may by this means determine the mercury volumetrically.

The reagent for detecting the presence of stannous chloride in excess is sodium molybdate. I dissolve a small quantity of molybdic anhydride in a solution of sodium hydrate or carbonate; I steep in this liquid a morsel of filter-paper, which I spread out whilst wet upon a plate of porcelain. The solution of molybdate ought to be freshly prepared, and the paper of good quality; it must not take a yellow tint on immersion in the alkaline liquid. The paper must be steeped in the molybdate only a little time before the experiment, so that it may not have time to dry.

The paper thus prepared shows a relatively slight excess of stannous chloride, which communicates to it according to its quantity a color varying from the lightest sky-blue to an intense blue. This color is due to the reduction of the molybdic acid. Ammonium molybdate, less stable than sodium molybdate, is less fit for use.

The determination of the value of the stannous solution may be made by means of a standard solution of iodine; but it is preferably

effected by operating upon a known quantity of pure mercuric chloride obtained by sublimation.

If we operate with iodine we obtain a slight error in excess due to the small quantity of stannous chloride, which must be used in excess to mark the end of the operation by spotting upon the molybdate paper. In any case it is well to determine the standard of the stannous solution by means of iodine approximately, if not exactly; this serves as a control, and facilitates at the same time the exact titration by means of mercuric chloride.

To prepare the solution of stannous chloride I dissolve 2 to 3 gm. tin by means of hydrochloric acid, and dilute it to 1 litre. This solution is preserved in an apparatus which prevents alteration by contact with air. I determine its strength as follows: 0.2 to 0.4 gm. of mercuric chloride weighed exactly are dissolved in 50 cc. of distilled water, acidulated with $\frac{1}{2}$ cc. of concentrated hydrochloric acid. Into this cold solution the stannous solution is allowed to flow from a burette. If the determination of the standard has been previously made with iodine, we may pour in at once, without fear of over-stepping the limit, the volume as determined by calculation from the titration with iodine; we then add the liquid drop by drop, stirring carefully, and each time putting a drop of the mixture with the stirring-rod upon the molybdate paper. An excess of a few drops of stannous liquid turns the paper to a pale blue, which becomes manifest after a few seconds, and which an experienced eye easily recognizes.

To obtain a well-marked coloration, it is necessary to use an excess of from 0.3 to 0.5 cc. for 50 cc. of liquid. The small quantity of mercurous chloride placed upon the molybdate paper whilst "spotting" has no injurious influence upon the result.

The proportion of free hydrochloric acid contained in the liquid should be about 0.5 cc. to 50 cc. of liquid; a larger proportion may occasion errors from its action upon the molybdic acid in presence of filter-paper.

To obtain exact results we must operate each time exactly as when standardizing the liquid. We must, as far as possible, operate upon the same volume of liquid, in presence of the same proportion of hydrochloric acid, and obtain spots of the same intensity upon the molybdate paper.—*Revue Universelle des Mines; Chem. News*, Aug. 19, p. 90.

PEPTONE SALTS FROM GLUTIN.¹

BY C. PAAL.

Mineral acids act on glutin in a similar manner to pepsin and trypsin, yielding peptones, which combine with the acid present to form salts; these dissolve not only in water, but also, unlike the free peptones, in absolute ethyl and methyl alcohol. For their preparation, 100 parts of purest commercial gelatin are warmed on the water-bath with 160 parts of water and 40 parts of concentrated hydrochloric acid until a portion of the product is completely soluble in a large quantity of absolute alcohol, and the whole is then poured into 4–5 vols. of absolute alcohol. After filtering off the inorganic salts, the solution is precipitated with ether, the residue redissolved in alcohol, and the solution evaporated under diminished pressure. The glutin peptone hydrochloride thus obtained forms a brittle, white, vesicular mass, and is readily soluble in water, methyl alcohol, ethyl alcohol, and acetic acid, somewhat less easily in propyl alcohol, sparingly in amyl alcohol, and insoluble in ether, carbon bisulphide, and benzene. It is very hygroscopic, remains unchanged at 130°, and gives the characteristic peptone reaction with biuret; it is lævorotatory in aqueous solution $[\alpha]_D$ being about -60° . The quantity of hydrochloric acid found in the different preparations varied from 10.5–12.5 per cent., whilst the ash is only about 0.5 per cent. If stronger hydrochloric acid than that mentioned above is employed, or if the heating be continued for a longer time, salts containing a larger percentage of acid can be obtained.

The quantity of carbon and hydrogen varies considerably in the different preparations, the former being in some cases higher than that of glutin (for which the author finds C = 50.1, H = 6.68), and in others less; this is due to the fact that in most cases more or less etherification has taken place during the treatment with alcohol; the compounds formed may, however, be hydrolyzed by long-continued boiling with water. The salts were found to be almost free from sulphur.

The fact that by varying the strength of the hydrochloric acid, and the time allowed for the reaction, compounds containing a varying amount of acid are obtained, tends to show that these salts

¹ *Berichte*, **25**, 1202–1236; *Jour. Chem. Soc.*, 1892, p. 895.

are mixtures of compounds representing different degrees of peptonization; this has been confirmed by subjecting the alcoholic solutions to fractional precipitation with ether, and subsequent fractional crystallization of some of the precipitates from alcohol. The salts thus obtained contain a varying percentage of acid, their solubility in alcohol decreasing with the decrease in the proportion of acid. A much more satisfactory separation is obtained by subjecting an aqueous solution of the salts to dialysis, for although they have not been obtained crystalline (probably owing to their hygroscopic nature), they, nevertheless, pass through the dialyser, and must be regarded as crystalloids. In this manner, a salt containing 10.56 per cent. of acid was separated into two portions, that passing through the dialyser containing 14.19 per cent. of acid, and the residue only 5.79, the latter being insoluble in absolute alcohol. The percentage of carbon and hydrogen, calculated on free peptone, remains fairly constant, except in so far as the salts passing through the dialyser are concerned; the decrease in this case is due to the fact that in evaporating the large volume of solution obtained, a quantity of alcohol is split off. It was found that only those salts containing 10 per cent. of acid and upward are soluble in absolute alcohol, and those fractions which are only just dissolved are much less soluble in propyl alcohol, and insoluble in amyl alcohol; the salts containing less than 10 per cent. are all readily soluble in methyl alcohol, and these also dissolve in alcoholic solution of the salts containing more acid.

The same separation may be brought about by treating the alcoholic solution of the salt with mercuric chloride; two mercuriochlorides are thus obtained, one of which separates out at once, and the second on the addition of ether; these correspond to the insoluble and soluble hydrochlorides, and may, like the mercuriochlorides of the free peptones, be employed for therapeutical purposes.

If glutin be warmed with a weaker acid than that first mentioned, a salt may be obtained which dissolves in methyl alcohol, but is insoluble in ethyl alcohol, and contains 6.85 per cent. of hydrochloric acid. It closely resembles the salts already described, and may, like them, be separated into fractions containing different percentages of acid, that containing the highest percentage being somewhat soluble in ethyl alcohol. By the action of pepsin on

glutin in presence of very dilute hydrochloric acid, a peptone salt is also obtained which closely resembles the salt last described, but is not completely soluble in cold methyl alcohol; it is separated by dialysis into two fractions, one of which contains 2.97 per cent. HCl, and is almost insoluble in methyl alcohol, whilst the other contains 11.13 per cent. HCl.

In all cases it appears that the salts formed either by the action of acid or of pepsin and acid are separable into two portions containing a maximum and minimum percentage of acid, and it therefore appears probable that the molecule of glutin contains two atom-complexes, which in the first stage of the reaction yield two separate molecules. These differ greatly in the resistance they offer towards further change, the one which forms salts containing a larger quantity of acid, being more readily converted into its ultimate products of decomposition, namely, the amido-acids.

The acid in the glutinpeptone salts is very firmly combined, and great difficulty was experienced in converting the salts into the free peptones. This was first accomplished by adding a large excess of alkali and removing the inorganic substances by dialysis, but great loss of substance also takes place. It was then found that the change may be brought about quantitatively by adding a slight excess of pure silver sulphate, filtering from silver chloride, removing the excess of silver with hydrogen sulphide, and the sulphuric acid with the necessary amount of baryta-water. The glutinpeptones thus obtained are soluble in all proportions in water, but insoluble in alcohol and ether; their aqueous solutions have an acid reaction towards litmus, but do not turn Congo paper blue. On analysis, it was found that the percentage of carbon was rather less, and that of hydrogen rather more, than in the case of glutin; this is in complete agreement with the supposition that they are products of hydrolysis.

Attempts were also made to determine the molecular weights of these substances by the cryoscopic method in aqueous solution and by the boiling-point method in aqueous and methyl and ethyl alcoholic solution. The results show that the molecule of peptone salt becomes smaller as the percentage of acid increases; further, that the salts are dissociated in aqueous and methyl alcoholic solutions, but not in ethyl alcoholic solution, for the molecular weight deduced from the boiling point of the solutions in the last solvent is double

that deduced in the same manner from the boiling point of the solutions of the same salt in the other two solvents. In water and methyl alcohol, the molecule of the salt is therefore dissociated into 2 mols., whence it follows that these salts consist of 1 mol. of peptone and 1 mol. of hydrochloric acid. The molecular weight of the free peptones was found to be about 300 in three cases, and about 215 in the fourth case, and that of gluten itself about 900.

The author concludes that the gluten molecule is resolved with assimilation of water into peptone molecules of gradually decreasing molecular weight, till a point is reached at which the peptonization ceases, and the simpler peptones are resolved into amido-acids, lysin, lysatin, etc. As, however, the molecule of the proteids consists of two atom-complexes which present a varying resistance to further hydrolysis, the simpler products of decomposition are always mixed with unaltered peptones.

NOTE ON DENITRATION OF PYROXYLIN.

BY DURAND WOODMAN, PH.D.

An interesting reaction, but one which seems to be considered of little practical importance, is that described in the brief references herewith given.

"Some nitrogenous substances, as albumen and pyroxylin, are reduced to a less complex form by certain deoxidizing agents, as ammonium sulphide, ferrous chloride, sulphurous acid and others, the change consisting in the loss of NO_2 ."—(*Gmelin, Hand-book, Vol. XVIII.*)

"A solution of potassium sulphhydrate especially if mixed with alcohol, reproduces the original cotton (from pyroxylin) with formation of KNO_3 and a little ammonia."—(*Watts' Dict. IV, 778.*)

"By the action of reducing agents, such as ferrous chloride or acetate, or potassium sulphhydrate, the cellulosic nitrates are converted into cellulose even by digestion at the ordinary temperature. By boiling with a solution of stannous oxide in KHO , the nitro-celluloses are dissolved, with conversion into cellulose, which is precipitated in flocks on neutralizing the liquid."—(*Allen, Com. Org. Anal., I, 327.*)

Samples of ordinary photographic collodion film and thin sheets of celluloid free from coloring or mineral matter, were reduced in a bath of ammonium sulphide.

It is necessary to dilute the reducing agent somewhat and keep the bath cooled by immersion in water during the early stages, or the reduction takes place with such rapidity that a very considerable rise of temperature results, accompanied by a deposit, in and on the material, of finely divided sulphur, which can be removed only by solvents. A too rapid reduction and consequent rise of temperature is also not without seriously injurious effect on the tenacity of the resulting cellulose film.

After washing for several hours in running water, the material is dried and will now burn quietly like wood or paper. Analysis of the material so obtained gave the following result, a parallel analysis of ash-free filter paper being made at the same time for comparison :

	DENITRATED PYROXYLIN.			Cellulose from Ash-free Paper.
C,	41·86	42·03	41·76	44·00
H,	6·14	6·18	6·07	6·32
O,	50·68	50·47	50·85	49·68
S,	·60	—	—	—
Ash,	·72	—	—	—
	100·00	—	—	100·00

The sheets of cellulose obtained by the denitrating process are very much reduced in area and increased somewhat in thickness, as compared with the original sheet of pyroxylin.

Measurements were made of a number of sheets before and after treatment to obtain figures expressing the approximate amount of shrinkage.

The average measures were :

	Length, Inches.	Breadth, Inches.	Thickness Inch.
Before treatment,	15·0	10·0	·0057
After treatment,	11·76	7·5	·007

The percentage decrease of area and volume (approx.) were as follows :

Number.	Area Decrease. Per Cent.	Volume Decrease. Per Cent.
I,	35	21
5,	40	37
7,	47	29
8,	46	22
9,	48	34
10,	45	28
11,	45	33

The decrease in volume can only be considered a rough approximation.

The material is slightly hygroscopic, quite strong, elastic, becoming somewhat brittle when very dry, and is translucent or transparent according to the purity of materials used in manufacture and thickness of the sheet. *Sp. Gr.*, 1.545

One of its most interesting practical applications has been the preparation from it, of incandescent electric lamp filaments, its homogeneity of structure, when carefully prepared, rendering it a promising substance for this purpose. As the reducing action will not penetrate beyond a few thousandths of an inch, the process can be successfully operated only on thin sheets of pyroxylin.—*Four. Amer. Chem. Soc.*, 1892, p. 114.

VEGETABLE AMYLOID.¹

BY E. WINTERSTEIN.

The substance described under the name "amyloid" is a constituent of the cell walls of certain plants, and gives the same coloration with iodine as starch does. According to Reiss (*Landw. Jahrb.*, 18, 733), on hydrolysis with dilute sulphuric acid, it yields considerable quantities of glucose, but as the material used by him also contained cellulose, this statement is open to the objection that the latter was the source from which the glucose was obtained. The author has therefore prepared pure samples of amyloid, and examined its behavior on hydrolysis, with results very different from those obtained by Reiss.

To prepare the amyloid, the seeds of *Tropæolum majus* were extracted successively with ether, cold alcohol, dilute ammonia, dilute soda, and cold water; the residue was boiled with water, fil-

¹ *Berichte*, 25, 1237-1241; *Jour. Chem. Soc.*, 1892, p. 803.

tered, and the solution precipitated with alcohol. The amyloid separates as a jelly, and is purified by redissolving in water and again precipitating with alcohol. It then forms a colorless, transparent jelly, which dries in the desiccator to an amorphous, vesicular mass, and is colored blue by iodine, the color disappearing on warming. Its aqueous solution is dextrorotatory ($[\alpha]_D = 93.5^\circ$), and it is not converted into sugars by diastase; on oxidation with nitric acid, it yields mucic acid, and with hydrochloric acid gives 15.44 per cent. of furfuraldehyde. On hydrolysis with 2.5 per cent. sulphuric acid, it yields galactose, together with a smaller quantity of another hexose of lower dextrorotatory power, and a pentose which yields trihydroxyglutaric acid on oxidation, and is therefore probably xylose, the second hexose being probably glucose. If the residue, after extracting the seeds with hot water, be boiled with 3 per cent. sulphuric acid, it yields further quantities of galactose and xylose.

The author, therefore, regards amyloid as a substance corresponding somewhat with starch or cellulose, but derived from galactose and xylose, instead of from glucose. Whether the substance is really homogeneous is not yet certain, but the fact that the amyloid prepared from the seeds of *Paeonia officinalis* yields almost the same quantities of mucic acid and furfuraldehyde is in favor of this supposition.

THE ANALYSIS OF COAL TAR PREPARATIONS.¹

BY H. HELBING AND DR. F. W. PASSMORE.

The value of preparations of tar oils as disinfectants is becoming daily more and more appreciated by the Medical profession and Sanitary experts. Yet whilst no doubt remains that the tar compounds are disinfectants *par excellence*, very little is known with respect to the determination of the individual value of these tar preparations by a scientifically accurate and yet easy method.

That the disinfectant value of such compounds may be established by bacteriological investigation is an idea that at once presents itself to the mind, and the method is certainly of very great value in experimenting with a new disinfectant of definite composition. Bacteriological research is, however, not of so much use in the com-

¹ Reprinted from *Helbing's Pharmacological Record*, July, 1892.

parison of tar oil preparations, owing to the element of uncertainty that enters into individual experiments and the great variations in the results occasioned by very slight deviations in the experimental conditions, such as are certain to obtain in the hands of different investigators. As the germicidal values of the principal chemical constituents of the various tar preparations in commerce are known, it appears indeed preferable to abandon direct bacteriological investigation and define the composition of the product from a chemical point of view, from which its true value as a disinfectant can be easily and reliably estimated.

Composition of Tar Oils.—The tar oils, whether distilled from coal, or wood, or bones, are, however, of such a complicated character that the task of separating them and estimating each individual constituent would be not only formidable but absolutely impracticable in commercial analysis. Nor is such a detailed investigation at all necessary to arrive at an approximate and reliable valuation of tar oils or preparations made from tar oils as disinfectants. Roughly speaking, the constituents of tar oils may be classified into three divisions: (1) The Tar Acids. (2) The Bases. (3) The Hydrocarbons, according to whether their acidic or basic nature most predominates, or whether they are of an entirely neutral character like hydrocarbons.

In the tar oils distilled from coal, which, of the different tar products, are generally or indeed almost without exception employed in the crude state in the manufacture of disinfectants, the hydrocarbon constituents form by far the larger proportion, and even these vary in chemical character and disinfectant value according to the origin and nature of the coal, the mode of distillation, the regulation of the temperature of distillation, and numerous minor details that more or less affect the chemical changes occurring during distillation and the composition of the resulting products. Amongst the ordinary commercial coal tar oils three products are especially distinguished as

LIGHT OIL, the fraction below 150° C., with a specific gravity of 0.9, and consisting principally of benzene and its homologues, and some naphthalene;

MEDIUM OIL, distilling between 150° C. and 210° C., possessing a specific gravity of about 1.01, and containing principally naphthalene and other hydrocarbons, carbolic acid, cresols and bases; and

HEAVY OIL, boiling between 210° and 300° C., having the specific gravity of 1.04, and containing naphtalene, anthracene, phenanthrene, and other hydrocarbons.

The tar oils from bones and wood are respectively richer in basic constituents and phenoloid compounds, and therefore afford a better source than the coal-tar oils for the isolation and preparation of definite compounds, so that they are less employed in the crude state.

Estimation of Tar Oils.—The physical characteristics of boiling point, specific gravity, viscosity, and solidifying point, although still frequently solely relied upon, afford very little reliable evidence as to the composition of the product. As the hydrocarbons, tar acids, and bases have very different and distinct values with regard to their disinfectant properties, the first step in arriving at a true knowledge of the chemical composition of the oil is the separation of these three classes of compounds. This is effected by shaking the tar oil with concentrated caustic soda solution, containing about ten per cent. hydrate, whereby the phenols and other acid constituents are removed, and either go into solution in the alkaline liquid or form a separate layer of sodium salt.

In technical analysis this process is carried out in a graduated tube, and the difference in volume of tar oil before and after the soda treatment gives the approximate quantity of tar acids present. The carrying out of the process is, however, accompanied by certain difficulties of manipulation arising from the viscous nature of the liquids and the difficulty with which they separate into layers. If much naphtalene be present, it is also liable to crystallize out when the acids are removed from the hydrocarbons and still further increase the difficulties. To avoid this it is customary to add ordinary ether or petroleum ether to the oil before shaking with soda, as these substances not only act as solvents of the hydrocarbons and prevent any tendency to crystallize, but also by mixing with them lowers their specific gravity and allows them to separate more easily. When the separation is complete the upper layer containing the hydrocarbons is removed, and the ether allowed to evaporate and the volume measured. The bases which are retained in solution by the hydrocarbons can be removed from the latter by treatment with dilute mineral acids and the bases obtained from the acid liquors in the form of salts.

This process affords an approximate idea of the composition of the tar oil, but it may be still further extended without much increase of manipulative details, so as to give a fuller idea of the disinfectant value of the product, in a manner that has proved extremely useful to us in the examination of Jeyes' Fluid and other coal-tar preparations. We refer to the more complete isolation of the constituents by a repetition of the above processes, submitting the hydrocarbons and tar acids to fractional distillation and weighing the different fractions.

Determination of Hydrocarbons.—For the analysis of a very concentrated coal tar preparation like Jeyes' Fluid 50 grammes suffices for examination, but of course more dilute preparations that contain comparatively small quantities of the disinfectant principles require that a larger quantity should be taken to obtain equally reliable results. After determination of the specific gravity and alkalinity of the preparation a weighed quantity is diluted with an equal or even with the double volume of ordinary ether, and then extracted several times with 10 per cent. caustic soda solution. The amount of soda solution employed for the above quantity should be about 100 cc. for the first shaking, the alkaline liquor then run off, and the ethereal layer containing the hydrocarbons and bases again shaken repeatedly with successive portions of 50 cc. soda solution until nothing further is removed. This stage is shown by the colorlessness of the alkaline layer, or by the absence of any tar acids separating when the alkaline liquor is acidified, four or five shakings generally effecting the required separation.

The ethereal layer is further washed once or twice with water to remove the greater part of the adherent alkali, and the alkaline liquors and washings mixed and again shaken once with ether to remove any naphthalene or other hydrocarbons that may have been dissolved in the alkaline liquor, or rather in the ether dissolved by the water. This quantity is appreciable, although not sufficient to seriously affect the analytical results, so that this operation may be left out, although a fairly liberal use of ether tends to increase the accuracy of the results.

The ethereal solution of the hydrocarbons is then extracted three or four times with about 20 cc. of dilute (1:4) sulphuric acid to remove the bases, washed with water to remove the excess of acid, and then dried by the introduction of a few pieces of calcium

chloride. The greater portion of the ether is distilled off on the water-bath, and the oily residue introduced with the aid of a little ether into a small weighed distillation flask with side tubulure in the neck.

On distillation with a free flame the temperature in the flask, measured by a thermometer the bulb of which should be above the level of the boiling fluid, remains under 40° or 45° C. until the last traces of ether have distilled over. The temperature then suddenly rises to 100° , 150° , or even 200° C., according to the character of the coal-tar oil that has been employed, and the hydrocarbons then commence to distil over.

The hydrocarbons that distil below 200° C. are generally of a limpid fluid character, but the fraction slightly above that temperature frequently solidifies owing to the presence of naphthalene, whilst above 250° C. the hydrocarbons that distil over are again of a liquid character, though distinctly viscous. Above 300° C. the distillation may be discontinued and the three fractions indicated weighed, as well as the undistilled portion in the flask, which generally becomes solid on cooling from the presence of anthracene and phenanthrene. The total weights give the amount of hydrocarbons in 50 grammes of the preparation, or multiplied by two the percentage. Not only does the amount and composition of the hydrocarbons vary much in different preparations, according to the degree of dilution and different tar oils employed, but the relation between amount of hydrocarbons and tar acids present in the preparations examined by us was also found to be very variable, ranging from equal parts of hydrocarbons and acid constituents in standard fluids to 20 parts hydrocarbons to 1 part acids in other preparations, which are consequently of inferior disinfectant value.

Although the hydrocarbons, especially those of higher boiling points, have a distinct antiseptic and disinfectant value, yet the tar acids, consisting principally of carbolic acid and the cresols, generally referred to under the name of cresylic acid, it is well known possess these properties to a far higher degree. The value of coal-tar preparations as disinfectants in fact depends to a large extent on the amount of tar acids present.

Determination of Acid Constituents.—The tar acids, including as they do phenol and its homologues, are not generally acids in the true chemical sense of the word, but so far partake of an acidic

character that they dissolve in not too dilute solutions of alkalis. For their determination the alkaline liquors removed from the hydrocarbons in the previous experiment are subjected to further treatment. Without driving off the ether dissolved in the liquors they are made decidedly acid with sulphuric acid, and the liberated tar acids that rise to the top of the solution are removed in a separating funnel. The acid liquor is then shaken twice with small quantities of ether, and the ethereal solution added to the remainder of the tar acids. The acid liquor now only contains inorganic bodies, either originally present in the preparation or introduced during its analysis, and traces of bases that owing to their solubility in water were not entirely removed from the solution by ether when alkaline.

The ether is distilled off on the water-bath from the tar acids after they have been washed with water and dried with calcium chloride. The residual acids are then introduced into a weighed fractionating flask of suitable size with the aid of ether, and subjected to distillation in the same way as the hydrocarbons. Carbolic acid boils at 183° C., whilst the three homologous cresols which constitute the chief constituents of cresylic acid boil, respectively, about 185° , 195° and 200° C. As soon as the last traces of ether have been distilled off, the temperature rapidly rises above 180° C., when the phenols commence to distil over, although, owing to the proximity of their boiling points, it is impossible to separate them to any extent by fractional distillation.

As carbolic acid possesses very dangerous toxic properties, whilst the homologous cresols are equally or even more efficient as disinfectants, and at the same time comparatively innocuous to the human system, it is preferable that carbolic acid should not be included to any great extent in the acid constituents of coal-tar preparations.

As it is stated that Jeyes' Fluid, which contains about 40 per cent. of acid constituents, and may therefore be regarded as possessing very high disinfectant properties, is free from carbolic acid, we endeavored to determine whether it was possible to detect small quantities of this substance in a mixture of cresols and analogous compounds. Operating upon small quantities this is impossible, as the ordinary color tests for carbolic acid and the formation of an insoluble bromine compound are useless, since the same reactions occur with the higher phenols.

The only method found practicable consisted of an adaptation of the commercial process for the separation of phenols, by fractionally precipitating the alkaline solution of the tar acids with small quantities of mineral acid, in which case the carbolic acid is concentrated in the first fraction, and, if necessary, the treatment repeated. Necessarily the results obtained increase in accuracy with the quantity of tar acids treated and by operating on 200 grams of the acids in this way we convinced ourselves that the above preparation contained less than one-quarter per cent. carbolic acid.

Higher homologues of phenol than the cresols are not found in any quantity in most of the commercial preparations, and the temperature therefore again rapidly rises above 210° C. This fraction should therefore be collected separately and weighed. If any considerable quantity still remains in the distillation flask, it generally consists of resin acids and their anhydrides derived from resin soap added for purposes of emulsification. These commence to distil about 250° C., but the greater part passes over at a temperature above that registered by a mercurial thermometer, and hardens again to a resin-like mass on cooling. From the analytical as well as the disinfectant point of view this emulsifying agent is far preferable to other bodies, like gelatine and saponin, that are employed for a similar purpose in some preparations, since the latter form emulsions in the analytical processes that make the separation of the ethereal layer very tedious, and considerably increase the difficulties of the analyst.

Determination of Bases.—The basic constituents of coal-tar preparations are extracted from the hydrocarbons with dilute sulphuric acid in the manner above described, after the removal of the acid constituents. They include pyridine and chinoline and their homologues, the separation of which would prove a difficult and unnecessary task. Two methods may be employed for their estimation, either of which, however, only gives an approximate value, the titration of the acid solution of the bases with a standard alkaloidal reagent or of the alcoholic solution with standard acid, calculating the amount of bases from an empirical combining weight, or the formation and direct weighing of their neutral salts. We adopted the latter process as the simplest and as affording perhaps the most reliable results, the sulphate of the bases being prepared in preference to the hydrochlorides as recommended in some text-books,

since the latter volatilize and decompose on evaporation to dryness, as the odor of the escaping vapors evidences.

For this purpose the free acid in the sulphuric acid solution was nearly neutralized with soda, evaporated nearly to dryness. Then finally neutralized and evaporated to complete dryness. By treatment of the residue with nearly absolute alcohol only the organic salts go into solution; the alcoholic solution is therefore filtered from the sulphate of sodium, evaporated to dryness and weighed. The result gives the amount of bases present as sulphates.

In the foregoing pages we have sketched an analytical process for coal-tar preparations which has given accurate and reliable results in our hands, and admits of a more complete examination of the products than the methods hitherto connectedly published. We hope that the information will prove valuable at the present time in aiding anyone examining and comparing the various coal-tar disinfectants in coming to correct conclusions as to their respective composition and the percentage of cresols on which depends the value of the preparation as a disinfectant.

MENTHOL.¹

By A. BERKENHEIM.

When menthol, $C_{10}H_{19}OH$, is added in successive small portions to a carefully cooled mixture of phosphoric chloride and light petroleum, there is formed from 100 grams of menthol (1) 70 grams of *menthyl chloride*, $C_{10}H_{19}Cl$, an optically inactive liquid boiling at $209.5-210.5^{\circ}$ (uncorr.), and having the sp. gr. at $0^{\circ}/0^{\circ} = 0.9565$ and at $15^{\circ}/15^{\circ} = 0.947$, and (2) 15 grams of a menthene, $C_{10}H_{18}$, boiling at $167-169^{\circ}$ (uncorr.). This menthene, when warmed with phosphoric chloride, yields a *chloride*, $C_{10}H_{17}Cl$, boiling at $204-208^{\circ}$. Menthyl chloride is not affected by zinc and hydrochloric acid, and is converted by zinc dust and acetic acid into the above-mentioned menthene; but it is reduced when heated for 30 hours at 200° with hydriodic acid and phosphorus in a sealed tube. *Menthonaphthene*, $C_{10}H_{20}$, boiling at $169-170.5^{\circ}$, is thus obtained. It is an inactive liquid, possessing only a feeble odor when pure, and the sp. gr. at

¹ *Berichte*, **25**, 686-698; *Jour. Chem. Soc.*, 1892, p. 866.

$0^{\circ}/0^{\circ} = 0.8067$ and at $15^{\circ}/15^{\circ} = 0.796$. It does not take up bromine, is not attacked by strong sulphuric or nitric acid at the ordinary temperature, gives when heated with fuming nitric acid a liquid nitro-derivative, and with bromine and aluminium bromide a viscid bromide. If the heating in the sealed tube is continued for only 15–20 hours, some *menthyl iodide*, $C_{10}H_{19}I$, is also obtained; this, when not quite pure, boils at $140-143^{\circ}$ under 30 mm. pressure, and has a sp. gr. at $15^{\circ}/15^{\circ} = 1.357$. When chlorine is allowed to react with the vapors of menthonaphthene, an inactive liquid is obtained, volatile with steam, boiling at $208-210^{\circ}$, and with a sp. gr. at $0^{\circ}/0^{\circ} = 0.9553$. It would seem to be identical with the above-mentioned menthyl chloride. When menthyl chloride (70 grams) is heated with potassium acetate and acetic acid for 20 hours in a sealed tube at 150° , some (20 grams) is left unaltered, and some menthene, $C_{10}H_{18}$ (25 grams), is formed. This menthene boils at $170-171^{\circ}$, has sp. gr. at $0^{\circ}/0^{\circ} = 0.8287$ and at $20^{\circ}/20^{\circ} = 0.816$, and refractive index $[n]_D = 0.145359$ at 20° , corresponding with a molecular refraction of 45.06 (theory for one double bond = 45.65, for two 47.34). It oxidizes readily in the air. But whilst the menthene obtained from menthol is dextrorotatory with a maximum rotation of $+20^{\circ}$, this menthene, obtained from inactive menthyl chloride, is lævorotatory (in a thickness of 200 mm. $[\alpha]_D = -56^{\circ}$), and the menthyl chloride which, as mentioned above, was not converted into menthene, is found to be no longer inactive, but is now lævorotatory (in a thickness of 200 mm. $[\alpha]_D = -62^{\circ}$). The inactive menthyl chloride must thus have consisted of a mixture of dextro- and lævo-rotatory varieties, and the former was converted into lævorotatory menthene, while the latter was unattacked. By further heating with potassium acetate and acetic acid, it may, however, be converted into a dextrorotatory menthene boiling at $167-169^{\circ}$; in a thickness of 50 mm. $[\alpha]_D = +28^{\circ}$.

Menthone, $C_{10}H_{18}O$, was prepared by the action of chromic acid on menthol in acetic acid solution, and warmed with phosphoric anhydride. A diterpene, $C_{20}H_{32}$, was obtained, together with a hydrocarbon $C_{10}H_{18}$ which was not isolated. The diterpene is a very viscid, fluorescent, inactive liquid boiling at $320-325^{\circ}$; it takes up bromine and hydrochloric acid, and yields a yellowish, amorphous nitro-product when treated with fuming nitric acid. When menthone is added in successive small portions to a cooled mixture of

phosphoric chloride and light petroleum, a *monochloride*, $C_{10}H_{17}Cl$, and a *dichloride*, $C_{10}H_{18}Cl_2$, are obtained. The monochloride boils at $205-208^\circ$, has the sp. gr. at $0^\circ/0^\circ = 0.9833$ and at $15^\circ/15^\circ = 0.970$, is lævorotatory; in a thickness of 50 mm. $[\alpha]_D = +30^\circ$, of 75 mm. $[\alpha]_D = +45^\circ$. The dichloride boils at $150-155^\circ$ under 60 mm. pressure, and has the sp. gr. at $0^\circ/0^\circ = 1.0824$. The monochloride is doubtless formed from the dichloride by the loss of a molecule of hydrochloric acid, but it was not found possible to remove the second molecule from the monochloride. When bromine is added to a cooled acetic acid solution of menthene, *menthene dibromide*, $C_{10}H_{18}Br_2$, is formed. It is a rather viscid oil, boiling at $167-172^\circ$ under 50 mm. pressure, and with the sp. gr. at $0^\circ/0^\circ = 1.4453$. When it is heated with alcoholic potash for 15 hours on the water-bath, a hydrocarbon $C_{10}H_{16}$ is obtained. This boils at $172-174^\circ$ (uncorr.), has an odor like that of limonene, and the sp. gr. at $0^\circ/0^\circ = 0.8540$ and at $20^\circ/20^\circ = 0.8408$; it unites with bromine and hydrochloric acid.

Terpine hydrate, $C_{10}H_{20}O_2 + H_2O$, was heated for 20 hours with strong hydriodic acid on the water-bath. The products were an *iodide*, $C_{10}H_{19}I$, a *diterpene*, $C_{20}H_{32}$, and possibly a hydrocarbon, $C_{10}H_{18}$, boiling at $167-170^\circ$. The diterpene boils at $320-325^\circ$, has the sp. gr. at $0^\circ/0^\circ = 0.9521$ and at $20^\circ/20^\circ = 0.9428$, and resembles very closely in its properties and reactions the diterpene obtained from menthone. The iodide is an oil with an odor like that of naphthene iodides; it boils at $138-142^\circ$ under 30 mm. pressure, and has the sp. gr. at $15^\circ/15^\circ = 1.370$. When it is treated with silver acetate, ether added, and the whole allowed to remain for two days, an acetate is obtained, and a hydrocarbon, $C_{10}H_{18}$, boiling at $168-170^\circ$. This latter has at 21° sp. gr. = 0.813 and refractive index $[n]_D = 1.45339$ corresponding to a molecular refraction of 45.89 (theory for one double bond 45.64). The acetate was hydrolyzed by warming it with the theoretical amount of alcoholic potash on the water-bath. The alcohol, $C_{10}H_{20}O$, thus obtained boils at $210-214^\circ$, and has an odor like that of menthol, but it cannot be got to solidify. It is inactive, and has the sp. gr. at $0^\circ/0^\circ = 0.9151$ and at $15^\circ/15^\circ = 0.9063$.

Menthol has thus been shown to be connected with the naphthenes; the particular naphthene obtained from it must have a ring of 6 carbon atoms, since menthol can be converted into cymene.

It is also connected with the terpenes, for terpene hydrate yields an alcohol, $C_{10}H_{20}O$, much resembling menthol; and, further, from menthol has been obtained a hydrocarbon, $C_{10}H_{16}$, which possesses the properties of a terpene.

SPURIOUS CUBEBS.

BY E. M. HOLMES, F.L.S.

Curator of the Museums of the Pharmaceutical Society of Great Britain.

A number of specimens for the Museum and Herbarium of this Society were received a few weeks ago from Mr. Leonard Wray, Jr. Curator of the Perak Museum, who is one of the recently elected corresponding members of the Pharmaceutical Society. When in correspondence with him some months since concerning cubebs and the ipoh or arrow poison of Perak, he promised to send specimens of the plants yielding them. He has now redeemed his promise by sending not only specimens of the desired plants but numerous others of considerable value and interest, together with information which seems to be of sufficient importance for publication.

Cubebs.—About seven years ago I directed attention to the fact that a variety of cubebs had appeared in English commerce which caused nausea and diarrhœa with other symptoms of poisonous action when taken internally (*Pharm. Journ.* [3], xv, p. 909). At the same time I pointed out that it did not give with sulphuric acid the crimson coloration characteristic of genuine cubebs, and that it possessed a mace-like odor. Further details as to color tests were subsequently published by Mr. E. D. Gravill (*l. c.*, p. 1005). A microscopical examination of this fruit was made at my request by Mr. W. Kirkby (*l. c.*, p. 653), who pointed out its distinctive histological characters, but added that it did not correspond to the *Piper crassipes* described by Flückiger and Hanbury in "Pharmacographia" (2d ed., p. 588), inasmuch as it had not a very bitter taste and had a shorter pedicel (*l. c.*, p. 654).

Subsequently Messrs. W. Elborne and H. Wilson expressed the opinion that the spurious variety "agrees entirely with that described by Flückiger and Hanbury and may be definitely referred to *Piper crassipes*" (*Pharm. Journ.* [3] xvi, p. 517). Not being able myself to identify the false cubebs with that species or any other, either at Kew or at the British Museum Herbarium, and agreeing

in Mr. Kirkby's cautious conclusion, I wrote to Dr. M. Treub, of Java, for fruiting specimens of any variety of cubebs that he could send me, at the same time forwarding some of this spurious cubebs to him for comparison, and also other false cubebs. Dr. Treub kindly sent specimens of the fruit of *Cubeba officinalis*, both dried and preserved in spirit, and an herbarium specimen of the plant without flowers or fruit. He remarked in his letter:

"As to the origin of the false cubebs sent to me I am sorry to say that they are not known to me, except the keboe cubebs, which seem to be the fruit of *Cubeba mollissima*, Miq. I believe the others are not from here."

The specimens sent by Dr. Treub were neither of them the false cubebs with the mace odor which I wished to identify botanically, and I then applied to Mr. H. N. Ridley, of Singapore, and Mr. L. Wray, of Perak, for information concerning it, thinking that if the false variety was unknown to Dr. Treub it was probably exported from some other island or country to Singapore, which is the central emporium of the Eastern Indies.

In reply to my inquiries Mr. Wray sent me an herbarium specimen of a cubeb plant and some detached fruits, with the following remarks:

"I heard that some wild pepper was collected in the district of Selama, and on going there recently I found that it was 'Lada berekor,' or tailed pepper. I got a specimen of it and of the plant, and I think as it too has a mace odor, and turns brown when crushed with sulphuric acid, that it is the variety of cubeb that you want. I am sending you a sample, as also the leaves of the plant. Might I suggest that it be examined physiologically, as it may have properties which would render it of service as a drug.¹ The Perak Government agent in Penang, to whom I applied for information, writes as follows: 'Nothing is done here in cubebs. I am told that Singapore is the place, and I have written for samples. They say it is difficult to tell the difference between spurious and genuine.'"

Meanwhile my attention was directed by a Dutch friend to the

¹ Mr. Wray has sent sufficient for this purpose, and I shall be pleased to place two-thirds of the quantity sent at the disposal of any investigator.—
E. M. H.

fact that merchants in Holland complain that cubebs which do not give the crimson color with sulphuric acid, but which were exported by the Java planters to Holland, do not find a ready sale. The hitherto unknown fact that false cubebs were cultivated in Java and exported to Holland (probably in ignorance of the fact that there is any difference between them) threw quite a new light upon the subject, and explained several points that required clearing up.

In the national herbaria in London there exist specimens of the cubeb plant (not in fruit) which differ considerably in the shape and size of the leaves, and the differences in the leaves appear to be constant in a series of specimens, indicating that probably more than one species is under cultivation. The information given by my Dutch friend led me to examine more carefully the specimens presented by Dr. Treub. On examination, in which my observations were checked by Mr. H. G. Greenish, it was found that the specimen preserved in spirit (which in size, shape, and length of pedicel resembles true cubebs), the fruits themselves did not give the crimson reaction characteristic of the genuine drug, but that on evaporation of the spirit in which they had been preserved, the residue gave the crimson color. On the other hand, the spike of dried fruit proved on examination to differ considerably from the specimen preserved in spirit. The fruits were larger and the stalks longer and somewhat flattened. The flavor, which is not mace-like, differed from that of true cubebs and the *taste was very bitter*. The fruits gave a yellowish brown but not a crimson reaction with concentrated sulphuric acid. The fruits are evidently not true cubebs, but those, in all probability, of the *Piper crassipes*, described by Hanbury and Flückiger in "Pharmacographia," and apparently the same as the large blackish cubebs imported into this country some months since. The absolute identity of these I shall endeavor to ascertain by histological examination. So far as observation by a lens and by taste are concerned, *Piper crassipes*, Korth., is the source of the dried cubebs sent by Dr. Treub and of the cubebs lately imported into England, but *not of the cubebs with a mace-like odor*.

The latter variety of cubebs yet remains to be identified, but as the plant yielding it is now traced to the plantations in Java further information will probably soon be forthcoming. In a volume of five hundred pages just received from Dr. Treub, and containing a history of the Buitenzorg Gardens and a large amount of informa-

tion concerning the plants grown in it, I find on p. 417, that the Soendaneese distinguish three varieties of cubebs, viz: "Rinoe tjaroeloek," "Rinoe katjentjan," and "Rinoe badak," *which are all present in plantations*. It further appears, from statements on the same page, that the plant cultivated as cubebs in the Java Botanic Gardens up to 1886 was not the true plant, and that the genuine species was subsequently procured and on being planted out produced flowers and fruit. The occurrence of two species in the specimens kindly presented by Dr. Treub is probably thus explained.

The specimen of cubebs which was presented by Mr. L. Wray does not, so far as I can discover, possess any mace-like odor; but, as he says, it gives a brownish color with sulphuric acid. By means of the herbarium specimen he has kindly sent, I have been able to identify the plant as *Piper ribesioides*, Wall. It agrees perfectly with specimens of this plant in the Natural History Museum at South Kensington and at Kew. *

Our present knowledge of cubebs and the substitutes for it met with in commerce may be summarized as follows:

The cubeb plants cultivated in Java are of three kinds. These are in all probability *Piper Cubeba*, Lf., *Piper crassipes*, Korth., and a third variety, with fruits having a macy odor.

Piper crassipes may be distinguished by its larger size, long, slender, flattened stalk, and its bitter taste. It does not give a crimson color with sulphuric acid.

The cubeb with a macy odor resembles the true cubeb in shape and size, but is grayer, more wrinkled, and does not give a crimson color with concentrated sulphuric acid.

The fruits of *Piper Lowong*, Bl. (*Cubeba Lowong*, Miq.) are stated by Flückiger and Hanbury to be extremely cubeb-like ("Pharmacographia," 2d ed., p. 58); and as this species is a native of Java, it is quite possible that it may yield the cubebs with a macy odor. I have not, however, been able to find in either of our national herbaria a specimen of this species in mature fruit.

The fruit of *Piper ribesioides* is collected in the Selama district of Perak in small quantity, but there is no evidence that it enters into English commerce.

In the report of the Buitenzorg Botanic Gardens above quoted, it is stated that the cubeb plant is more easily propagated by layers

than by slips.¹ In making the layers the stems are laid on the ground and covered with only a little earth. From these prostrate stems numerous erect shoots arise. It is found that quick growing trees must not be used as supports, as these are apt to break the cubeb stems by their rapid growth. When raised from seed the young plants are germinated in pots in the shade or under glass, but when the leafy stems are developed they are planted out in the full light, although the plant is a native of the bushy woods. The cubeb plant does not afford a large yield of fruit.—Pharm. Jour. and Trans., Aug., 1892.

MEETINGS OF STATE PHARMACEUTICAL ASSOCIATIONS.

The Arkansas Association of Pharmacists convened at its tenth annual meeting at Fort Smith, June 21. President Shendal in the chair, and listened to an address from the president and to the reports of officers and committees. The subjects of the papers read were: Process for tincture of opium, by J. A. Ginochio; English and American calomel, by J. M. Anderson; Pharmaceutical notes, by W. W. Kerr, and J. W. Beidelman; and identification of the ordinary drugs and chemicals, by E. T. Mitchell. J. W. Morton, Fort Smith, was elected president; J. W. Beidelman, Little Rock, secretary; and J. A. Jungkind, Little Rock, Treasurer. The next meeting will convene at Little Rock, the date to be announced hereafter.

The Colorado State Pharmacal Association assembled at its third annual meeting at Denver, August 4, and was welcomed by Mayor Rogers. President Ford read an address; the various officers and committees presented their reports, and papers were read on adulterations and sophistications by Nich. Anderson; on antiseptics, germicides, disinfectants and deodorizers, by C. D. Lippincott, and on the chemical resources of Colorado. H. M. Whelpley, C. S. Hallberg, J. P. Remington and J. M. Maisch were elected honorary members. J. W. Turrell, Longmont, was elected president; J. F. Feezer, Greeley, treasurer, and Felix A. Lyneman, Denver, secretary. The next place of meeting, date, and local secretary will be named by the executive committee.

The Iowa Pharmaceutical Association met in Davenport at its thirteenth annual meeting, June 14. The usual routine business, the president's address, reports of officers and committees, examination of the work done by students in pharmacy, and discussions on practical pharmaceutical matters, claimed the attention of the meeting. The officers elected are: T. W. Ruete, Dubuque, president; Dr. Rosa Upson, Marshalltown, secretary; and J. H. Webb, De

¹ This is perhaps more easily understood when it is stated that the cubeb is a climbing plant attaching itself to its support by roots which are formed near each leaf base, and one side of the stem, as in ivy.—E. M. H.

Witt, treasurer. The association intends holding its meeting in 1893 in Chicago.

The Michigan State Pharmaceutical Association held its tenth annual meeting at Grand Rapids, August 2, President Coleman in the chair. A number of papers were read, mostly giving the results of work done in the School of Pharmacy, University of Michigan. Various legislative measures were discussed, and the discussion of the cut-rate problem led to the recommendation that the sale of proprietary articles handled by cutters be discouraged, and that in their place medicines of similar properties, manufactured by or for pharmacists, be offered to the public. Stanley E. Parkill, Owosso, was elected president; C. W. Parsons, Detroit, secretary, and W. H. Dupont, Detroit, treasurer. It has been proposed to meet next year near Detroit and then adjourn to Chicago.

The Minnesota Pharmaceutical Association opened its eighth annual meeting at Duluth, July 13, and adjourned on the following day, transacting mostly routine business, and discussing legislative measures and trade interests. A paper on commercial glycerin from animal and vegetable fats was read by L. A. Harding. The officers for the present year are: C. R. J. Kellam, Heron Lake, president, and C. T. Heller, St. Paul, secretary and treasurer. The time and place of the next annual meeting will be decided upon by a committee appointed for the purpose.

The Missouri Pharmaceutical Association had its fourteenth annual meeting June 14, at Excelsior Springs, where it has met for several years in succession. In addition to the president's address and to the reports of officers and committees, several papers were read by Dr. Curtman, G. H. C. Klie and others. The present officers are: G. H. C. Klie, president; Dr. Whelpley, secretary, and G. J. Meyer, treasurer. The next meeting will again be held in the same place June 13, 1893.

The Montana State Pharmaceutical Association, at its second annual meeting, held at Butte, elected H. M. Parchen, Helena, president; W. M. McGinnes, White Sulphur Springs, treasurer, and J. B. Lockwood, Helena, secretary.

The New York State Pharmaceutical Association met at its fourteenth annual meeting at Syracuse, May 24. The address of President Ingraham; the various official reports, and certain trade interests afforded subjects for discussion. During the past year a bill, originating with the Woman's Christian Temperance Union, had been before the New York Legislature prohibiting the sale of preparations of opium, cocaine and chloral, except upon physicians' prescriptions. A committee appointed to consult with the W. C. T. Union reported that the latter body had promised not to press the passage of the bill until after the next session of the legislature so as to afford to druggists and apothecaries the opportunity of discussing it thoroughly. W. L. DuBois, Catskill, was elected president; C. W. Holmes, Elmira, Secretary, W. B. Fuller, Oswego, treasurer, and F. E. Hatch, Jamestown, local secretary for the next meeting to be held at Lakewood, Chautauqua Lake, in June, 1893.

The North Carolina Pharmaceutical Association held its thirteenth annual meeting at Raleigh, August 10, when the reports of officers and committees were presented, and various matters of pharmaceutical interest were discussed.

Professor Caspari, of Baltimore, read a paper on the assay of alkaloidal drugs and galenical preparations, and illustrated the processes by experiments. He was elected an honorary member. The officers for the present year are : H. R. Cheers, Plymouth, president ; A. J. Cook, Fayetteville, treasurer ; F. W. Hancock, Oxford, secretary ; and F. A. Bobbitt, Winston, local secretary. Next year the Association will meet at Winston, August 16.

The Wisconsin Pharmaceutical Association was convened August 8, at Oshkosh, in the thirteenth annual meeting, and finally adjourned to meet in August next year at Fond du Lac, Jas. T. Dana being the local secretary. Henry Rollman, Chilton, was elected president ; W. P. Clark, Milton, treasurer, and E. B. Heimstreet, Janesville, secretary.

Proceedings of State Pharmaceutical Associations for 1892 have been received as follows :

Alabama. Eleventh meeting. Pp. 71. (See July number, p. 382.)

Georgia. Seventeenth meeting. Pp. 120. (See July number, p. 383.)

New York. Fourteenth meeting. Pp. 268. (See above.)

EDITORIAL.

The Flückiger Memorial, to which attention was called on p. 172 of this volume, is now an accomplished fact. Professor Dr. Tschirch, under date of July 1, reported the total amount collected to be francs 12722.09, exclusive of frcs. 7127.45, sent by several American gentlemen as a personal present to Professor Flückiger. In accordance with the plan originally published, an address was presented to him, July 9, bearing the signatures of all the contributors, viz : 27 societies and 702 individuals. A medal struck in gold, silver and bronze, bears on one side the relief portrait of Professor Flückiger, and the reverse side the inscription : *Scientia non unius populi sed orbis terrarum*. For 307 photographs sent an album was specially made and artistically embellished ; and a supplementary album was procured for the photographs subsequently received. After deducting the expenses for the above there remained the sum of francs 10,000, available for a foundation, and provisionally deposited in a bank in Bern, Switzerland, the present place of residence of Prof. Flückiger.

Professor Edward Schaer, for a number of years Professor of Pharmacy, and director of the pharmaceutical department of the Polytechnikum at Zurich, we learn from German journals, has been appointed Flückiger's successor at the University of Strassburg.

Professor Emil Fischer, of the University of Würzburg, has been called to the University of Berlin as the successor of A. W. Hofmann, deceased in May last ; and the vacancy made at the former institution was filled by calling Professor Th. Curtius, of the University of Kiel, to the chair of chemistry.

The Pharmaceutical Examining Board of Pennsylvania, at its meeting in Williamsport, July 12, examined 47 candidates for registered pharmacists and 27 for qualified assistants. Twenty of the former and fourteen of the latter were successful.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Feestnummer der Berichten van de Nederlandsche Maatschappij ter Bevordering der Pharmacie. Uitgegeven ter gelegenheid der feestelijke Herdenking van haar vijftig-jarig Bestaan. 's Gravenhage: De Gebroeders Van Cleef. Juli, 1892. 4°. Pp. 189.

The Society for the Furtherance of Pharmacy in Netherland was organized in 1842, and in July last it celebrated the fiftieth anniversary of its existence. The volume before us has been published in commemoration of this event. It does not contain a full account of the transactions on that occasion, but only the address then delivered by the presiding officer of the Society, Dr. P. Ankersmit. Nearly the whole of the book is taken up by scientific and practical essays and researches written especially for this festive occasion. The pharmaceutical laboratory of the University of Utrecht contributes six papers. The remaining twenty-five contributions have as authors as many members of the Society. The subjects treated of belong to different fields of pharmacy, all of practical application. Among the authors, who are probably best known on this side of the Atlantic, may be mentioned L. van Itallie, Prof. Oudemans, Prof. Stoeder, Dr. De Vrij.

Popular German Names of Domestic Drugs and Medicines.—Volksthümliche Deutsche Arzneimittel-Namen. Bearbeitet von Dr. Fr. Hoffmann. Revidirte und vermehrte Auflage. New York: 1892. Office of Pharmaceutische Rundschau. 8vo. Pp. 36. Price, 40 cents; or 75 cents for two, and \$1 for three copies.

With commendable care the author has collected not only those German names for drugs and medicinal preparations which are usually met with in printed works, but likewise those which are popularly employed in different districts of Germany. A dictionary containing considerably over three thousand names has thus been made up, for each of which the Latin equivalent is given. Its practical value and usefulness to pharmacists having dealings with German-speaking customers is quite evident. For the rarer preparations there is also a list of references given, indicating where formulas for the same may be found, and it will be seen that quite a number of these are contained in the National Formulary.

A Manual of Organic Materia Medica, being a guide to Materia Medica of the Vegetable and Animal Kingdoms, for the use of Students, Druggists, Pharmacists and Physicians. By John M. Maisch, Ph. M., Phar. D., etc. Fifth edition. With 270 illustrations. Philadelphia: Lea Brothers & Co. 1892. 12mo. Pp. 556.

The fifth edition of this work has passed through the press and will be issued in a few days. In the preface we are informed that it differs from the preceding edition mainly in this that the recent observations and researches on the various articles of Materia Medica, as far as they come within the scope of the work, have been incorporated, and that the pronunciation of the systematic names of plants and animals has been indicated by marks of accent. The text has also been carefully revised with the view of rendering the characterization of the drugs and of their constituents even more precise and available for critical research. A number of new illustrations, partly replacing

others, have been prepared in elucidation of structural descriptions, and the pharmacopœial drugs have been more conspicuously distinguished by the selection of smaller type for those articles which are not recognized by the Pharmacopœia, or which at present are scarcely ever met with in commerce. Of the same importance as pharmacopœial crude drugs appear to be such, which—like *Juniperus virginiana*, *Rhamnus Purshiana*, etc.—bear a close resemblance to officinal ones, or which—like *Sabadilla*, *Cocculus indicus*, etc.—are the sources of proximate principles, admitted into the Pharmacopœia as important remedies. In indicating the pronunciation the U. S. Pharmacopœia has been closely followed; but in several cases where different pronunciations appear to be sanctioned by good authorities, the two forms are given side by side.

The Extra Pharmacopœia. By Wm. Martindale, F.C.S., etc. Medical References and a Therapeutic Index of Diseases and Symptoms, by W. Wynn Westcott, M. B. Lond., etc. Seventh edition. London: H. K. Lewis. 1892. Pp. 524.

On the appearance of previous editions of this useful work we have explained its scope and arrangement. As it deals primarily with non-pharmacopœial articles, it is a very acceptable supplement to the Pharmacopœia. The present edition has been brought up to date by the incorporation of new facts given in recent pharmaceutical literature, and of new claimants for honors as remedial agents, such as analgene, camphoid, euphorin, iodopyrin, phenocoll, salicylamide, salophene, etc. That many of these new remedies reach only an ephemeral reputation is well known; but they have to be carried in works of reference as ballast for some time; and the prospects are that their number will continue to increase, as long as manufacturers will find it remunerative to bring upon the market new inventions heralded as important remedies before they have been sufficiently tested by unbiased investigators.

Experimental Farms. Reports for 1891. Printed by order of Parliament. Ottawa. 1892. 8vo. Pp. 348. Price, cloth, 25 cents.

These reports to the Minister of Agriculture of the Dominion of Canada have been prepared by the Director of Experimental Farms, Wm. Saunders, and under his supervision.

Book on the Physician Himself, and Things that Concern his Reputation and Success. By D. W. Cathell, M.D. Tenth Edition. Carefully revised and greatly enlarged. Philadelphia: The F. A. Davis Company, Publishers. 1892. 8vo. Pp. 343. Price, \$2 net.

That this book has met with so much favor must be quite gratifying to the author. On a former occasion (this journal, October, 1889, p. 541) we commented on it somewhat in detail, and now that it is before us in a new garb, we need merely say that the care bestowed upon it in revising the text has not in the least detracted from its merits, but, if such be possible, has improved it. It is a work that deserves to be read, and that should be read with profit to the reader, as we pointed out before. How to do this the author tells us in the preface. "I beg you," he advises, "to judge it, good reader, not by opening it here or there, nor by glancing at detached paragraphs; but read it through, from cover to cover, or better still, *study its pages*, and thus qualify yourself to weigh correctly its teachings, which I would fain have to harmonize with the

advice given by the Bishop of Lonsdale to those who came to him inquiring the way to heaven : " Turn to the right, then go straight forward."

Ueber die Isomeration höherer Homologen des Aethylens und Acetylens. Von L. Reuter. Heidelberg. 1892. 8vo. Pp. 29.

On the isomeration of the higher homologues of ethylene and acetylene. This inaugural essay is dedicated to Prof. Flückiger.

Planten en Plantenstoffen. Door M. Greshoff. Batavia. 1891. Pp. 28.

This is a discourse on plants and plant constituents, delivered by Dr. Greshoff, at Batavia, before the Society for Natural History in Dutch India, and which treats of the importance of phyto-chemistry in the broader sense of the term.

The reception of the following theses from the École supérieure de Pharmacie de Paris is herewith acknowledged :

Recherches sur quelques Corps Gras d'origine végétal. Par Ernest Gérard. Pp. 74.

Researches on some fats of vegetable origin, viz : of stramonium seed, oats, and of two fungi, *Lactarius vellereus* and *L. piperatus*.

Recherches nouvelles sur les Vins. Par Louis Joseph Hugounenq. Pp. 32.

New researches on wines containing among others processes for the estimation of tannin and for the extraction and examination of coloring matters in wine.

Étude sur la neutralisation des Acides et des Bases par la méthode des conductibilités électriques. Par Paul Alfred Daniel Berthelot. Pp. 45.

Study upon the neutralization of acids and bases by the method of electric conductibilities.

Contribution à l'Étude histologique des Lauracées. Par E. Perrot. Pp. 62.

Contribution to the histological study of lauracæ ; the structure of stems and leaves has been more particularly studied.

Sur un nouveau Corps gazeux, le Pentafluochlorure de Phosphore. Par Camille Poulenc. Pp. 23.

On a new gaseous body, pentafluochloride of phosphorus, prepared by acting with chlorine upon trifluoride of phosphorus ; the composition of the gas is PF_3Cl_2 .

Contribution à l'Étude chimique du Chloroforme ; action des Sulfures de Potassium et de Sodium. Par Louis Demont. Pp. 64.

Contribution to the chemical study of chloroform ; action of the sulphides of potassium and of sodium.

Detail Illustrations of Yucca and Description of Agave Engelmanni. By Wm. Trelease. 8vo. Pp. 10, and 25 plates.

The Yucca Moth and Yucca Polination. By Chas. V. Riley. 8vo. Pp. 60, and 10 plates.

The Fruiting of Parmelia molliuscula. By Thos. A. Williams. 8vo. Pp. 2, and 1 plate.

These three monographs are reprints from the third annual report of the Missouri Botanical Garden. The subject matter of each is readily ascertained from the title, but special attention may be called to the fact that the first one

gives also the botanical description of a new species of agave, the origin of which has not yet been determined; and that the last one gives an account of the apothecia of a lichen, which, though frequently collected in different parts of the globe, has always been regarded as being sterile.

On Citronellone, an unsaturated fatty aldehyde. By Edward Kremers.

Menthene. By F. A. Sieker and E. Kremers.

Two reprints from Amer. Chemical Journal, xiv, Nos. 3 and 4.

The Limonene Group of Terpenes. By Edward Kremers.

This essay, covering 51 pages, was read before the Wisconsin Academy of Sciences, Arts and Letters, December 30th, last, and is reprinted from volume viii of its Transactions.

OBITUARY.

Professor Valerian Ossipowitch Podwissotzky died at Kasan, Russia, June 28, aged seventy years. He was born in 1822 and studied law, passing his examinations in 1842, after which he was called to various state and municipal offices. At the age of fifty, he matriculated at the University of Dorpat as a medical student, and graduated as doctor of medicine in 1878, his inaugural dissertation being "anatomical researches of the tongue glands of man and mammals." While in Dorpat he investigated emetine and the constituents of ergot, of *Lippia mexicana* and of resin of *podophyllum*, researches which gained for him a world-wide reputation. In 1885, he was appointed professor of pharmacognosy and of pharmacy to the University of Kasan where, in 1886 he published a manual of pharmacognosy in the Russian language. The deceased was a corresponding member of the Philadelphia College of Pharmacy.

The following graduates of the Philadelphia College of Pharmacy are deceased:

James S. Bell, class 1869, died in Peoria, Ill., May 25, 1892, from disease of the kidneys. He was born and educated at Bolton, Peel Co., Ontario, and after serving an apprenticeship at Albion, came to Philadelphia, and clerked with the late Professor Edward Parrish. After graduating, he went to Peoria, and started in business in 1874, the title of the firm being Bell & Miller until 1877, since which time he carried on the business until his death. He leaves a widow and one daughter, and is survived by his father and a sister.

William E. Knight, class 1838, died in Philadelphia, June 9, of uræmia, at the age of 73 years. He was a native of England, and came to this country with his parents when 5 years of age. For some years he had been clerking for Francis Bond, at the corner of Tenth and Locust Streets, and succeeded to the business more than forty years ago. For years he had been one of the "characters" of the city, his bent form and smiling face and his dusty little store, which was somewhat of an old curiosity shop, being well known to the residents of his neighborhood, particularly to the poor and destitute whom he freely befriended, and of whom many attended the funeral services. Although he gave away money and medicines with a free hand, Mr. Knight was successful in business and died rich. He was never married.

THE AMERICAN JOURNAL OF PHARMACY.

OCTOBER, 1892.

PEPSIN ASSAY.

BY M. B. MANWARING.

To obtain reliable results, the conditions herein specified, however unimportant some of them may appear, must be carefully observed when testing the proteolytic power of pepsins.

Prepare an excessive quantity of acidulated water, containing 0.2 per cent. absolute hydrochloric acid (HCl), thus:

Hydrochloric acid, U. S. P.	48 min. or 3 cc.
Distilled water sufficient to make	16 fl. oz. or 473 cc.

For every 1,000 grains of albumen required provide 2.17 fresh eggs. Put the eggs in boiling water and boil for fifteen minutes, then cool them with cold water. Separate the whites by the aid of a perfectly clean and bright spatula (preferably of bone), and if necessary wash away any adhering yolk and dry the coagulated albumen with a clean towel. Press the whites through a 30-mesh hair sieve; avoid if possible using a brass sieve.

The acidulated water and the coagulated albumen being ready, as also a water-bath at a temperature of 105° F.

Weigh <i>exactly</i> , pepsin,	½ gr.
Weigh with approximate accuracy coagulated albumen, . .	1250 gr.
Measure acidulated water,	27 fl. oz.

Carefully transfer the pepsin to a wide mouth bottle or flask of about 2½ pints capacity, adding a little of the measured portion of acidulated water. If the pepsin is in scale form, and the day is damp, so that the pepsin is inclined to become sticky, it should be

weighed as quickly as is consistent with accuracy on a balanced watch-glass or evaporating dish, and if any sticks to the dish it must be rinsed out with some of the acidulated water and thus all transferred to the bottle or flask. The weighed albumen is to be triturated in a small mortar with some of the acidulated water, and the mixture then poured into the bottle containing the pepsin, using the remaining acidulated water for rinsing purposes. The corked bottle and contents are now to be subjected to the heat of the water-bath, maintained at 105° F. as nearly as possible, for 6 hours, being well shaken not oftener than once every five minutes and at least every ten minutes, always restoring the bottle to the bath quickly. At the end of 6 hours, if the pepsin tests 1 : 2,500, not more than a few undissolved flakes should remain, consisting mostly of the membranous portion of egg.

If the means of weighing are sufficiently accurate, it is an advantage as regards labor and time to use $\frac{1}{4}$ gr. of pepsin instead of $\frac{1}{2}$ gr., reducing correspondingly the albumen and acidulated water, or, accuracy may be attained and still less materials used, by thoroughly triturating in a small Wedgewood mortar 1 gr. of a pepsin with 9 gr. sugar of milk, $1\frac{1}{4}$ gr. of the mixture containing $\frac{1}{8}$ gr. of the pepsin. The greatest care is necessary in weighing the pepsin, for $\frac{1}{100}$ part of a grain of a 1 : 2,500 test pepsin dissolves 25 gr. of albumen. Prescription weights and scales are generally far too inaccurate for operating with less than $\frac{1}{2}$ gr. of pepsin. It is certainly advisable to provide a set of accurate grain weights.

The foregoing proportions of materials are given for the purpose of enabling one to prove whether or not a pepsin test 1 : 2,500; or, which of two or more brands most closely approximate this power, in which case the same *quantities* of materials are always to be used.

If testing a pepsin claimed to be of higher or lower power than 1 : 2,500, it is necessary to observe the same conditions given, and maintain the same proportions of albumen and acidulated water, varying only the quantity of pepsin—for instance, in testing a 1 : 2,000 pepsin, use one-fourth more pepsin, thus, albumen 1,250 gr. + acidulated water 27 fl. oz. + a 1 : 2,000 test pepsin $\frac{5}{8}$ gr., or of a 1 : 2,500 test pepsin $\frac{1}{2}$ gr.

If a pepsin is of unknown strength, its proportion must vary until the quantity is found which will practically dispose of all the albu-

men present within the prescribed time, and under the conditions given. This, of course, requires a series of trials. From this ascertained proportion is figured the power, thus: if twice as much of one pepsin as of another is required to do the same work under like conditions, with no excess of albumen present, then the former pepsin has one-half the power of the latter; or if one-half as much is needed then it tests double that of the other—the dissolving power of a pepsin is inversely proportional to the quantity of pepsin required.

A 100 Minute Assay.—The writer has found that any pepsin tested under the following conditions, will dissolve exactly one-half as many times its weight of coagulated albumen as by the 6-hour test, in 100 to 105 minutes. We can thus obtain reliable results without so much sacrifice of time—a pepsin dissolving 1,000 times its weights of albumen at 125° F. in 100 minutes, will dissolve 2,000 at 105° F. in 6 hours. The conditions are: The same relative proportions of the acidulated water and albumen as by the long time test; but one-half of each as compared with the weight of pepsin used; temperature 125° F.; agitation every 5–10 minutes; time 100–105 minutes; practically complete solution of all the albumen present. Hence the following formula—for the sake of even numbers and a unit, a 1 : 2,000 test pepsin is designated.

Take pepsin (1 : 2,000 by the 6-hour test),	0.01 parts, or gm. or $\frac{1}{4}$ gr.
Coagulated egg-albumen (fresh egg, boiled 15 minutes, white pressed through 30 mesh hair sieve, . . . }	10 parts, or gm. or 250 gr.
Distilled water containing 0.2 per cent. HCl, }	100 parts, or gm. or cc. or $5\frac{1}{2}$ fl. oz.

Using the above designated number of *grams*, a flask is required of at least 100 cc. capacity when about two-thirds full; or $5\frac{1}{2}$ fl. oz. for the *grain* weights given. For every 100 gm. of albumen required provide 3.33 fresh eggs. Measure the prescribed quantity of acidulated water at ordinary laboratory temperature. Put the pepsin in the flask with a little of the acidulated water; follow with the albumen previously triturated with some of the acidulated water; rinse mortar and neck of flask with remaining acidulated water, and immediately set flask in a water-bath, which is already at 125° F. Maintain this temperature within a degree above or below for 100–105 minutes, rotating flask every 5–10 minutes. If

several tests are to be compared as to relative quantities or residual albumen, should there be any, the flasks should be rapidly cooled to below 60° F. In determining the power of different pepsins, the only allowable variation from above formula should be the proportion of pepsin—of a pepsin testing 1:2,500 in 6 hours, 0.008 gm. would be required to do the work of 0.01 gm. of a pepsin testing 1:2,000 by the 6-hour test.

Generally the operator knows enough about a pepsin to be assayed, to judge closely as to the quantity to use. In any event he can soon determine by one assay whether or not a given brand is of the power claimed for it. If nothing is known about a pepsin to be assayed, one test with 0.01 gm., another with more, and a third with less of the pepsin, can be made simultaneously, and judgment formed from results about the quantity required for the final test. As a safeguard, and especially to provide against variations in albumen, it is advisable always to carry through one control test with a pepsin of known power.

When several tests are to be made of one brand of a soluble pepsin, or when minute quantities cannot be accurately weighed, it is often an advantage to make a solution of a known quantity of pepsin in acidulated water, bringing the solution to a known volume. By this means any required quantity of pepsin can be accurately and quickly apportioned by measure. In such cases 0.1 gm. of pepsin, plus acidulated water (containing 0.2 per cent. HCl) sufficient to measure 100 cc., makes a solution of which 1 gm. pepsin is represented by 1,000 cc.

ESTIMATION OF EUGENOL IN OIL OF CLOVES.

BY JOSEPH C. DE LA COUR, PH.G.

From an Inaugural Essay.

The method proposed by H. Thoms (*Phar. Centralhalle*, 1891, p. 589) for the estimation of eugenol is based upon the formation of benzoyl-eugenol, and is carried out as follows: 5 gm. of the oil, 20 gm. of solution of sodium hydrate and 6 gm. benzoyl chloride are placed in a tared beaker of 150 cc. capacity and thoroughly mixed; the mixture becomes quite hot, and after it has cooled again, 50 cc. water are added and heat is applied until the crystalline mass melts, after which the mixture is again allowed to cool; the clear liquid is run

through a filter, previously dried at 101° C. and weighed, and the operation of washing the crystals is repeated twice with 50 cc. of water. To remove the sesquiterpene, contaminating the benzoyl-eugenol, the crystals are washed with alcohol by adding to the still moist mass in the beaker 25 cc. alcohol of 90 per cent., warming until solution is effected, and then rotating the liquid until crystals begin to separate, when the contents of the beaker are allowed to cool to 17° C., transferred to the weighed filter and washed with a little 90 per cent. alcohol until the filtrate measures 25 cc.; the filter and contents are now transferred to the beaker, dried at 101° C. and weighed. To the weight of the benzoyl-eugenol thus obtained, 0.550 gm. must be added, representing the amount soluble in the 25 cc. of 90 per cent. alcohol. This weight, multiplied by 164 (the molecular weight of eugenol) and divided by 268 (the molecular weight of benzoyl-eugenol) gives the amount of eugenol in 5 gm. of the oil; to obtain the percentage, multiply again by 20.

In performing the experiment, the author suggests to pour into the tared beaker containing the oil, simultaneously from two separate vessels, the sodium hydrate and benzoyl-chloride, and then stir with a glass rod. The results obtained were as follows:

	Specific Gravity.	Eugenol. Per Cent.
(1) Oil of cloves, distilled by author,	1.0675	77.96
(2) " commercial,	1.0514	78.74
(3) " "	1.0502	75.08
(4) " "	1.0483	72.26
(5) " "	1.0490	74.22
(6) " old, distilled by Professor Remington,	1.0752	75.74
(7) " clove stems, distilled by author, .	1.0552	87.10
(8) " " commercial,	1.0441	80.34
(9) " " "	1.0452	77.78

These results agree with the observation of Dr. Thoms that the specific gravity has no uniform relation to the percentage of eugenol present, and that, besides the eugenol and terpene, probably a third compound is present in the oil which may account for the variation.

It will be observed that all the commercial samples are rich in eugenol, also that the oil of clove stems, although not so fragrant, shows a rather larger percentage of eugenol.

NOTE BY THE EDITOR.—According to the semi-annual report of Schimmel & Co. (April, 1892, p. 20), the method yields concordant

results within the limits of 1 per cent., but is not suitable as a practical pharmacopœial test on account of the time its execution occupies. While the suggestion of Thoms, that a minimum percentage of eugenol in clove oil should be a pharmacopœial requirement in the future, is well worthy of consideration, it is suggested by that firm that eugenol be employed in place of oil of cloves, since the former can be prepared in a state of purity without difficulty, and its purity easily determined. For the latter purpose it is only necessary to observe the specific gravity (1.072 at 15° C.) and boiling point (253–254° C.), and to ascertain that it forms a clear solution in potash solution of 2 or 1 per cent.

EUPATORIUM PERFOLIATUM.

BY HENRY F. KAERCHER, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.
No. 115.

The leaves and flowering tops of this plant have already been examined by several investigators, but the underground portion does not appear to have been analyzed.

A quantity of the root was collected in Northeastern Ohio, and, after carefully drying, was submitted to proximate analysis with the following results:

	Per Cent.
Fat and resin (soluble in ether),	0.60
Resin and bitter principle (soluble in alcohol),	1.59
Mucilage,	1.75
Dextrin,	3.00
Glucose,	1.45
Saccharose,	5.60
Undetermined extractive (soluble in water),	4.90
Soluble in dilute sodium hydrate solution,	2.42
Soluble in diluted hydrochloric acid,	2.70
Inulin,	4.90
Other products (soluble in hot water),	3.40
Lignin,	17.62
Cellulin,	24.69
Asb,	10.67
Moisture,	12.40
Loss,	2.31
Total,	100.00

The inulin was estimated in a separate portion of the drug, according to Dragendorff's method, with the above results.

The alcoholic extract was soluble in acidulated water to the extent of one-third of its weight. The solution was bitter, and gave evidence of the presence of a glucoside.

Ferric chloride gave faint indications of tannin. A portion of the aqueous solution of the alcoholic extract was agitated successively with petroleum ether, stronger ether and chloroform. No residue was left on the spontaneous evaporation of the petroleum ether and stronger ether, but chloroform left a minute quantity of colorless crystals.

In order to more fully investigate the constituents, about one kilogram of the powdered drug was exhausted with 95 per cent. alcohol, and the solvent recovered. The residue was poured into two volumes of water and the resin, which precipitated, was filtered out. The solution was then agitated successively with petroleum ether, ether and chloroform. The results were similar to those obtained with the alcoholic extract. The aqueous solution was then made alkaline with sodium hydrate, and submitted to the same solvents in the order above given. Petroleum ether and ether removed nothing of importance, but chloroform extracted a bitter, brown, resinous substance. This was redissolved in water and again extracted by agitation with chloroform. On the spontaneous evaporation of the latter solvent, a light pink, amorphous, and intensely bitter substance remained. Several attempts were made to obtain this residue in a crystalline form, but without success. It gave no reactions with either alkaloidal or glucosidal reagents. Any medicinal virtue that this drug may possess is no doubt due to this amorphous bitter principle.

The crystalline principle removed from the acidulated solution by chloroform possessed all the characters of a resin.

EUPATORIN: THE ACTIVE PRINCIPLE OF *EUPATORIUM PERFOLIATUM*.¹

BY C. H. SHAMEL.

The dried *eupatorium perfoliatum*, gathered at blooming-time, was extracted by hot alcohol in a continuous extraction apparatus

¹ Amer. Chemical Journal, 1892, xiv, p. 224. A crystalline glucoside was isolated by G. Latin and F. W. Franz, see American Journal of Pharmacy, 1880, p. 392, and 1888, p. 77. See also paper by H. F. Kaercher, above.

for several hours. The excess of alcohol was distilled off and the thick residue treated with water acidulated with hydrochloric acid. A black gummy mass separated, which was removed by filtration, the filtrate neutralized with sodium carbonate and extracted with ether. On evaporation of the ether the active principle was deposited, either as a yellow resinous mass or as a yellow powder, which, on examination under the microscope, was found to consist of globular masses of needle-shaped crystals. The crystalline variety was analyzed for nitrogen, but was found to contain none. The principle, in both the amorphous and crystalline forms, was insoluble in water, in concentrated sulphuric acid and in concentrated hydrochloric acid, but was soluble in even dilute nitric acid with a light-brown coloration. The nitric-acid solution, when allowed to evaporate spontaneously or in a vacuum over lime, crystallizes in beautiful prisms and six-sided plates.

An aqueous solution of these crystals injected into mice killed them in a few hours. The crystals, when taken into the mouth, have first an acid taste from the nitric acid they contain, followed by a very bitter taste. The aqueous solution has only the bitter taste.

Chemical Characteristics.—The crystals of the nitrate are easily soluble in water and melt at $102-103^{\circ}$. The principle itself does not melt, but at 250° suffers partial decomposition.

The solution of the nitrate was tested with the common alkaloid reagents, but gave the following reactions only: Phospho-molybdic acid, a green color; picric acid, a few needle-shaped crystals; auric chloride, colored slightly.

The principle is soluble in the alkalies. The solution in sodium hydroxide gave the following reactions, parallel tests being made with the sodium hydroxide solution alone: Phospho-molybdic acid, an instantaneous brilliant green coloration which soon fades; auric chloride, a black flocculent precipitate; picric acid, a deep-red coloration.

The ultimate analysis of the crystallized nitrate deprived of its water of crystallization gave the following figures:

C	H	O	N
25.7 per cent.	3.1 per cent.	64.2 per cent.	1.55 per cent.
26.2	2.7	64.1	1.6

Or calculating the N as HNO_3 , we have $\text{HNO}_3 \left\{ \begin{array}{l} 6.97 \text{ per cent.} \\ 7.20 \end{array} \right.$

These figures would indicate that the formula is $C_{20}H_{25}O_{36}HNO_3$, which would require the following as the theoretical composition.

C—26.49 per cent. H—2.76 per cent. O—64 per cent.
N—1.54 per cent. = HNO_3 —6.96 per cent.

GILLENIA STIPULACEA, *NUTTALL.*

BY GORDON L. CURRY, PH.G.

From a thesis presented to the Louisville College of Pharmacy, and published in the American Practitioner and News, May 7, 1892, p. 294–298, we make the following abstract relating to the analysis of the subterraneous organs which, on drying finally in a hot-air oven, lost 42.9, and in another experiment 35.9 per cent. of moisture; on incineration 10 gm. of the powder left 0.16 gm. ash.

Benzene extracted from 20 gm. of the powder 0.30 gm. fat, partly liquid. The ethereal extract subsequently obtained was partly—about one-third—soluble in water, and nearly two-thirds soluble in alcohol, both solutions being bitter, but free from alkaloids. For the isolation of the bitter principles, 200 cc. of infusion were prepared from 20 gm. of the powdered drug with hot distilled water, and the liquid agitated with ether.

The ethereal liquid was evaporated in a beaker glass and at a low temperature, leaving a small amount of slightly yellowish crystalline residue. A portion of this residue, on being dissolved in acidulated water, decomposed Fehling's solution very readily. The remainder of the residue was dissolved in water, treated with ether, and the ethereal layer evaporated yielding a small amount of white, feathery crystals, soluble in water, alcohol, and dilute acids. After boiling with sulphuric acid and treating with Fehling's solution, a reduction of the copper immediately ensued. Other tests for glucosides produced positive results. The glucoside is colored red by sulphuric acid; yellow by nitric acid, and deepens the color of chromic acid. The author proposes the name *gillein* for this body, which in the dose of $\frac{1}{4}$ grain was observed to produce nausea, approaching emetic action.

The aqueous infusion after having been treated with ether, deposited in a few days a pinkish powder, brown after drying, insoluble in alcohol and water, of a bitter taste, and colored different shades of yellow with the reagents named above. The sherry-colored

filtrate, evaporated on a water-bath, produced a dark brown residue, which on examination showed the presence of sugar, gum, extractive, and a tannin striking a greenish-black color with a solution of ferric chloride.

The aqueous layer of the second ethereal treatment, on concentration, acquired a yellowish color. Before heating and during evaporation this liquid produced no reaction with Fehling's solution, unless previously heated with sulphuric acid showing the stability of the glucosidal body. The residue left on evaporation was treated with little water, the solution filtered from the reddish flocculent residue, and evaporated, leaving an amorphous substance soluble in water, sparingly so in alcohol and ether and presenting all the reactions of a glucoside, for which the name *gillénin* is proposed. In this condition it is inodorous, yellowish, of a faint taste at first, but becoming very bitter, and shows no reaction with iron salts or gelatin, and no color reaction with the acids mentioned above. The quantity being quite small, its action when taken internally was not determined.

These principles are evidently different from the *gillénin* obtained by W. B. Stanhope, from *Gillenia trifoliata* (see Amer. Jour. Pharm., 1856, p. 200), which was colored blood-red by nitric acid, and green by chromic acid.

Note is made by Stillé and Maisch that the dust of *Cephaëlis Ipecacuanha* attacks the mucous membrane of the nose and throat, producing congestion of the larynx and bronchia, causing coughing and sometimes rejection of fibrinous sputum. In comminuting the *Gillenia stipulacea* the dust arising from it caused, like the aforementioned plant, dryness of the nose and throat, and left a slight congestion of the larynx, which did not wear off for about twenty-four hours. A convenient form of administration will no doubt be secured in the tincture, made 10 per cent. in strength with 50 per cent. alcohol. Another form, and the one more usually employed, is the decoction. The mention by Barton of this species being the more valuable, as well as its remote use by country folk, would seem to indicate its medicinal value, and would warrant a trial by the medical fraternity.

Petroleum has been found in Peru, near the seashore. Spec. grav., '810 to '840. It is rich in low-boiling constituents.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

Decoction of Vaccinium Vilis-idæa in rheumatism.—In 1887, Dr. Sanine proposed the use of the cowberry plant, *Vaccinium Vitis-idæa* for rheumatism. Following this, Dr. Herman administered the decoction with good success to three patients, one being an old man who was suffering for three and one-half years with muscular articular rheumatism.

Dr. Smirnoff (*Wratch*, through *Bull. de Thérapeut.*, 1892, p. 470), used a decoction of the whole plant in the proportion of 30–60 gm. to 500 cc. water. The decoction is dark in color, not clear, has a bitter taste and neutral reaction. Nine patients were treated; with seven a cure was effected, with two no effect whatever, was produced. The treatment lasted from three weeks to three months.

Phloroglucin in plants.—To determine the presence of phloroglucin T. Waage (*Ann. Agron.*, 1892, p. 204) makes use of Günzburg's reagent (see *Amer. Jour. Phar.*, 1888, p. 240); one drop of the vanillin solution (0.005 in 4.0 HCl) will detect 0.001 mgm. phloroglucin. He observed that gymnosperms are rich in phloroglucin, monocotyledons and gamopetalæ contain little, and polypetalæ are destitute of this compound. As a rule, woody plants are richer than herbs, but the distribution in root, stem and leaves of the same plant is nearly uniform. The author regards it as a by-product of plant life; it enters into the formation of very complex principles (phloroglucosides), is connected with the production of phlobaphenes and certain coloring matters, and is usually met with in plants containing tannin.

Atropine in hyperacidity of the stomach.—Dr. Voinovitch (*Bullet. de Thérapeut.*, 1892, 471) based on the experiments of Drs. Netschaeff and Popoff, exhibited sulphate of atropine in a case of stomachal hypersecretion. The dose used was three-quarters of a milligram three times a day by the mouth. After the third day pain had stopped and vomiting had ceased. After the tenth day the gastric juice was examined and found to be almost normal.

Hydrastis canadensis in the vomiting of pregnancy.—Dr. Fedorow (*Rev. de Thérap.*, 1892, 388) gives 20 drops of the fluid extract of hydrastis four times a day in cases of vomiting of pregnancy. The

drug acts by reducing the arterial pressure, relieving the congestion of the uterus and by calming the excitability of the vaso-motor centres of the gastrointestinal tract.

The testing of fats with acetic acid is recommended by Ferd. Jean (*L'Industrie laitière*, June 26) for recognizing their purity, and as control experiments of results obtained by other methods. Equal measures of the acetic acid (spec. grav. 1.056) and the fat, 3 cc. of each, are introduced into a narrow graduated tube, the fat being previously heated to 50° C., and the acid measured at 22°; the tube is placed in a water-bath, agitated occasionally, and when the two liquids have completely separated, the volume of undissolved acid is noted. It has been observed that under the conditions stated the following fats dissolve different quantities of the acetic acid; namely, cocoanut oil, castor oil and mineral oil, each 100 per cent.; butter from nine districts, 63.33 (from two other districts, 58.33 and 73.0, respectively), Indian poppy oil, 63.3, beach nut oil, 53.3, French poppy oil, 43.3, neats' foot oil, 43.3, ground nut oil, 43.6-41.65, palm oil, 4.00, nut oil, 36.6, olive oil, 35.0, mustard oil, 33.3, almond oil, 33.0, colza oil, 30.0, lard 26.66 per cent.; rosin oil dissolves nothing.

Artificial gum arabic.—For the preparation of a so-called artificial gum arabic the *Rev. de chim. indust.* (through *Nouv. Remèdes*, 1892, No. 13 supplm.) gives the following process: 10 kilograms linseed are boiled with 80 kilograms sulphuric acid and 100 litres of water for three or four hours. The liquid is then filtered and four times its volume of alcohol is added. The precipitate is collected, washed and dried. The product is amorphous, colorless, insipid and gives with water a thick mucilage.

Parsley.—Dr. Mourgues (*Soc. chim. de Paris*, June 24, 1892), isolated from parsley a higher homologue of apiol which he named cariol $C_{14}H_{18}O_4$. It polymerizes easily and yields a penta-brom-carior $C_{14}H_{13}Br_5O_4$. The physiological action of carior is similar to that of apiol, but weaker.

Strontium preparations.—Dr. Bardet (*Rev. de Thérapeut.*, 1892, 410), prescribes the iodide and bromide of strontium in a like manner as the salts of potassium and sodium, however, without the fear of producing gastric intolerance.

Syrup of strontium bromide.—Syrup of sweet orange, syrup of bitter orange aa 150 gm., strontium bromide 30 gm.

Solution of strontium iodide.—Distilled water 300 gm., strontium iodide 20 gm.

Solution of strontium lactate (C. Paul)—Distilled water 250 gm., strontium lactate 50 gm.

Antimony, phenol and bromides in whooping cough.—Dr. Liebermeister (*Rev. gén. de Clin. et de Thérap.*, June, 1892) recommends the following treatment.

(I) During the catarrhal period, rest in bed, and administration of the following mixture: golden sulphuret of antimony 0.50, mucilage of gum acaciæ 20.00, distilled water 50.00, simple syrup 20.00. Teaspoonful every hour or two.

(II) In the convulsive stage: inhalations of solution of sodium phenate, potassium bromide or sodium salicylate, and a potion of cochineal and potassium carbonate. To combat the paroxysms of cough use narcotics (opium), anæsthetic (morphine) or inhalations of 10–20 drops of ether 4 parts, oil of turpentine 1 part. Lastly give quinine and a potion consisting of extract of belladonna 0.50, syrup of ipecac 25.00, wine of antimony 10.00, and distilled water 150.00 gm. Dose, from two to six teaspoonfuls during the day.

(III) A sojourn in the country.

Bismuth benzoate has been prepared by Vigier (*Le Progrès méd.*) by double decomposition between bismuth nitrate and sodium benzoate. It contains 27 per cent. of benzoic acid, and has been recommended as an intestinal antiseptic.

Benzonaphthol is regarded by Dr. Gilbert (*La Tribune méd.*) as a valuable intestinal antiseptic which is not altered in the stomach, but is decomposed in the intestine into benzoic acid and naphthol.

Asaprol or calcium β -naphtholsulphonate, according to Stackler (*Comp. rend.*, cxiv, 1027), may be readily obtained by operating with pure β -naphthol, free from the α modification. It is freely soluble in water and alcohol, has a neutral reaction, is not irritating, is but slightly poisonous and is excreted through the urine. It acts as an antipyretic in various infectious diseases, and when used in comparatively large proportion prevents the development of the bacteria of cholera, typhoid and anthrax. Physiological experi-

ments made with rabbits showed that injection of 0.5 gm. per kilo of body weight caused death in a few hours; 0.285 gm. proved to be injurious, but 0.160 gm. injected every two or three days, or 0.06 gm. every three or four hours, were well supported for two weeks, and the latter for two months.

Ammoniated essence of lavender for smelling bottles.—The *Revue de Thérapeutique*, 1892, 418, publishes the following formula to be used in smelling bottles with pieces of ammonium carbonate. Alcohol, 250 cc.; oil of lavender, 10 cc.; oil of bergamot, 12 cc.; oil of cloves, 5 cc.; oil of cinnamon, 5 cc.; oil rose, 1 cc.; tincture of musk, 10 cc.; concentrated ammonia, 250 cc.

Mineral Waters of Japan.—Dr. Michaut (*Bull. de Thérapent.*, 1892, I, 549 and II, 27), publishes analyses of a number of mineral waters of Japan:

Atami: Sodium chloride, 3.790; magnesium chloride, 2.333; potassium chloride, 1.810; calcium chloride, 1.767; calcium sulphate, 0.190; calcium bicarbonate, 0.004; ferrous carbonate, 0.003; silica, 0.003; bromides, 0.110; manganese, trace; total, 10.007 gm. in 1 litre water.

Ashinoyou: Sulphuric acid, 0.3760; calcium carbonate, 0.0423; potassium silicate, 0.1390; magnesia, 0.0324; phosphates, traces; alumina, 0.0430; chlorides, traces; sodium carbonate, 0.0243; organic matter, traces; potash, 0.0109; oxide of iron, traces; total, 0.662 gm. to 1 litre. Besides the above this spring contains also considerable sulphuretted hydrogen.

Arima: Sodium chloride, 14.717; potassium chloride, 1.281; calcium chloride 2.896; magnesium chloride, 0.241; aluminium chloride, 0.029; lithium chloride, traces; ferric carbonate, 0.246; manganese oxide, 0.055; calcium sulphate, 0.014; silica, 0.058; undetermined salts, 0.118; organic matter, traces; total, 16.655 gm. to 1 litre.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

Salol-coated pills have been recommended like keratin-coated pills when the pills are not intended to dissolve in the stomach, as the salol is only decomposed in the duodenum into phenol and sali-

cylic acid. A solution made of 2 gm. salol, 0.5 gm. tannin and 10 gm. ether has been proposed for this purpose, but A. Suchomel doubts if such a coating is effective, and proposes dipping the pills into melted salol (it melts at 42° C.), contained in a small dish placed upon a water-bath for a few minutes; after taking the pills off the needles the small apertures are closed by applying a little melted salol with a small brush. The coating hardens almost as soon as taken out of the bath, and the pills have the appearance of being sugar-coated. It is suggested that boli containing extracts of pomegranate or male-fern, koussin, etc., be coated in this manner since it is much easier accomplished than keratin-coating; gelatin capsules can also be coated by immersion in the melted salol, one-half being dipped, withdrawn and then the other half dipped.—*Phar. Post*, 1892, 899.

Ipecacuanha assays.—The following criticism of the present methods of extracting emetine was arrived at after a considerable period of laboratory observations: (1) Zinoffsky's method, titrating with Mayer's reagent gave such discordant results that it was soon rejected. (2a) Flückiger's method, extracting the powdered root with hot chloroform-ammonia, is not complete after prolonged extraction (more than ten hours), and gives a residue which is largely contaminated with resinous substances. (2b) The method modified by Kremel, by dissolving the residue in dilute acid, liberating the alkaloid with ammonia and extracting with chloroform gives very low results since the alkaloid is not completely removed (ten extractions with 30 cc. chloroform failing to remove it entirely), the greater the excess of ammonia used the greater the difficulty. Experiments proved that if pure emetine dissolved in water be agitated repeatedly with chloroform the fifth extraction was found free from alkaloid; hence, the deduction that the root contains substances soluble in chloroform, which later prevent the removal of emetine; or again, it was found that heat rapidly decomposed the alkaloid; a temperature of 50° C. turns it of a brown color and causes it to react differently towards reagents. (3) Kremel's assay, drying a paste made of root, lime and water and extracting with chloroform, was shown to give low results, owing to the difficulty in extracting (after thirty hours the residue was not exhausted) and that the residue obtained was not soluble in dilute

acid. (4) The extraction of the root with ammoniacal alcohol, evaporating to dryness and exhausting with chloroform also gave low results; but here the explanation, verified by experiment, is that emetine warmed with solutions of ammonium salts causes the liberation of ammonia and then the alkaloidal salt produced escapes extraction by the chloroform. (5) A modification of Lloyd's method gave low results, a residue almost black and impure, and incomplete extraction. This method, however, suggested the following one which gave the best and most exact results. (6) It is advisable to extract the powdered root without drying it, since heating makes the extraction of the alkaloid more difficult; moisture should, therefore, be estimated in a separate portion. 15 gm. powdered ipecac are placed in a bottle with 148 cc. 90 per cent. alcohol and 2 cc. hydrochloric acid, sp. gr. 1.12 (measured at 15° C.), and digested, with frequent agitation, at 40° C. for four days; after cooling to 15° C. 100 cc. are removed, mixed in a capsule with 20 cc. of a 10 per cent. alcoholic lead acetate solution (50 per cent. alcohol) and, after the addition of 1.5 gm. slaked lime, evaporated, with occasional stirring, to a pasty consistency; 5 gm. powdered glass are then incorporated, heating continued on a water-bath with constant stirring until a dry powder results; this is then extracted for 10 hours with chloroform, the chloroform solution evaporated in a weighed vessel, dried at 100° C. and weighed. This gives a crude alkaloid which is then dissolved in 2 cc. normal hydrochloric acid the insoluble matter gotten upon a weighed filter, thoroughly washed, dried and weighed. The total residue minus the weight of the insoluble resin leaves the weight of the pure alkaloid.

The percentages as given below are calculated to dried drug; in methods (4) and (5) after repeating the extraction and making allowance for resin present the percentages agree closely with those in method (6).

Ipecac.	2a. Per Cent.	2b. Per Cent.	3. Per Cent.	4. Per Cent.	5. Per Cent.	6. Per Cent.
Rio,	3.09, 3.12, 3.00	1.72, 1.86	1.72	1.74	2.60	2.37, 2.24
Singapore, . . .	3.24	1.62, 1.74	—	—	—	2.22, 2.30
Carthagera, . . .	2.24, 2.10	1.23, 1.38	—	—	—	1.81

—G. Kottmayer, *Pharm. Post*, 1892, 913 and 933.

Salol-emulsion.—Salol is best taken internally in the form of an emulsion, made by melting 10 gm. salol in a capsule or water-

bath, transferring to a warm mortar, mixing with 5 gm. powdered acacia and emulsifying after the addition of 7.5 gm. luke-warm water; this accomplished, 10 gm. more of the warm water are added and the mortar with contents allowed to cool before adding the remaining quantity of water. If the warm emulsion be diluted at once with the full quantity of water, the salol will separate as a crust in the vessel and agitation will not loosen it; prepared as directed, the salol separates as a very fine powder, and is easily incorporated by agitation. The emulsion has the odor of salol, but is nearly tasteless; sweetened with syrup it is a very desirable preparation for children. For dispensing a concentrated emulsion is convenient since it is also permanent.

Salol-glycerin.—Ten gm. salol, 5 gm. acacia and 7.5 gm. water are emulsified as above and then after cooling diluted with glycerin to make 100 gm. It forms a thick, milky mixture, separating the salol as a very fine powder which is readily incorporated again. Useful in throat affections, and adapted for application with a brush.

Salol-vaselin.—Made by melting 1 gm. salol with 9 gm. vaselin and stirring until cool. Used for chapped hands and lips, also for rough skin.—A. Suchomel, *Pharm. Post.*, 1892, 954, 955.

Antinonnin is the name given to a paste containing fifty per cent. ortho-dinitrocresol-potassium; to prevent the paste from drying out a small quantity of soap is added, as the absolutely dry salt is an explosive compound. Proposed first as a means of protecting trees from the ravages of insects, it has since been found to be a poison for all forms of lower animal life; in quantities of less than one milligram the pure chemical is a sure destroyer of mice, while two centigrams will suffice for rats, in consequence of which phosphorus pastes are to be superseded. As a preservative of wood favorable experiments are reported. It is generally used in aqueous solution 2 : 500, in which strength it can be advantageously used in the treatment of itch; for the development of poisonous symptoms very much stronger solutions must be used (1 : 30 applied with a brush produced poisoning of a horse). An objectionable property of the remedy is the intense yellow color which is in some cases removed with difficulty.—*Siidd. Apoth. Ztg.*, 1892, 233 and 241.

Indicator in alkaloidal assaying.—The alkalimetric estimation of the alkaloids extracted in a crude state has been very unsatisfactory,

due to the lack of a suitable sensitive indicator ; as such Dr. A. Partheil recommends iodo-eosine, but to be of advantage it must be used in an ethereal solution (0.002 in one litre ether). To the acid solution of the crude alkaloid 20 cc. of this ethereal solution are added, when after agitation the aqueous solution will be colorless and the ethereal solution nearly so ; by titrating with $\frac{0.001}{1000}$ alkali and agitating, the least excess of alkali causes the iodo-eosin to dissolve in the aqueous solution with rose-red color. The titrations require considerable time and must be carried out in a stoppered flask but these inconveniences are balanced to a certain extent by the indicator allowing titrations to be made with $\frac{0.001}{1000}$ alkali. The indicator is suitable for the estimation of strychnine, brucine, atropine, hyoscyamine, aconitine, coniine, morphine and cytisine; quinine cannot be titrated with it, probably for the reason that this alkaloid is so very soluble in ether and so insoluble in water.—*Apotheker Ztg.*, 1892, 435.

Pillyanine, the alkaloid of the South American *Lycopodium saururus*, has only recently been obtained in the crystalline form as white lustrous crystals melting at 64–65° C. It is easily soluble in water, alcohol and chloroform, less soluble in ether; the salts are deliquescent and unstable. The formula for the alkaloid is very probably $C_{15}H_{24}N_2O$. By distillation in hydrogen a volatile nicotine-like base is obtained, which is probably identical with oxyamyl-nicotine. Its powerful physiological action is exerted upon the nervous system; the hydrochlorate in doses of 0.1–0.2 is capable of killing a dog. The plant itself is used in Brazil as a tæniifuge.—Arata and Cauzoneri (*Boll. chim. farm.*) *Apotheker Ztg.*, 1892, 404.

Succinic acid, according to Pasteur, is produced in the alcoholic fermentation in a definite ratio to the glycerin (1 : 5), other investigators reporting different results. Mr. Rau studied the fermentation of various sugars at 15°, 25° and 35° C.; in the absence and presence of air ; and as caused by different kinds of yeast. His conclusions are: Low temperatures will not decrease the quantity of succinic acid, but will decrease the quantity of glycerin; the addition of nourishment to the fermenting liquid does not increase the yield of succinic acid, but strongly increases the yield of glycerin; the presence or absence of air during the fermentation is without influence upon both glycerin and succinic acids; an energetic action

of the yeast cells will generally augment the formation of succinic acid. Succinic acid independently of the glycerin formation is a normal product of the alcoholic fermentation.—(*Arch. f. Hygien.*) *Apotheker Ztg.*, 1892; 411.

Iodine.—Prof. Meineke found that iodine will not change when exposed to the air for a few hours; after five days' exposure the loss is so slight as to come within the limits of error; under the most favorable conditions for absorbing moisture (powdered iodine kept beside a vessel containing water under a bell-jar) it did not absorb more than 0.1 per cent.—*Chemiker Ztg.*, 1892, 1126.

Japanese plant constituents.—*Mosula japonica* (N. O. Labiatae) a small plant having the characteristic odor of thymol, yielded 2.13 per cent. of a volatile oil sp. gr. 0.820 at 17.5° C.; odor, faintly thymol-like; freezing mixtures caused no separation of crystals until after treatment with strong sodium hydrate solution, when 44 per cent. of the oil taken separated; the stearopten was proven by analysis and tests to be thymol.

Valeriana officinalis var. *angustifolia*, Mig.—The root yielded 2.7 per cent. volatile oil (more than the European variety) of sp. gr. 0.805 at 17°, (lævogyre in 5 cm. tube — 55.5°); valerianic acid was identified as one of the constituents.

Datura alba, Nees.—The capsules before the introduction of chloroform, were used as an anæsthetic in Japan. The plant contains both hyoscyamine and atropine, the former being present in much the larger quantity.

Picrasma eilantoides, Planch. (Simarubaceæ), owing to its bitter taste is called "Nigaki" (Bitter wood); the bark of the wood was found to contain a crystalline body identical with quassin.—Dr. Shimoyama, with H. Ono, K. Hyrano, and T. Koshima.—*Apotheker Ztg.*, 1892, 439, 440, 458, 459.

Myrrholin, a patented solution of myrrh made by digesting the gum-resin with castor oil and alcohol, is intended for use as an embalming and conserving agent; capsules of the same have been prepared containing 0.2 myrrholin and 0.3 creosote.

Unguentum Myrrhæ made by heating together one part myrrh with ten parts of a mixture of wax and fixed oil, is used in eczema

answering as well as some of the newer antiseptics.—*Pharm Central-halle*, 1892, 500.

Sozal is aluminium paraphenolsulphonate obtained by either dissolving aluminium hydrate in paraphenolsulphonic acid, or by double decomposition of aluminium sulphate and barium paraphenolsulphonate. It is brought upon the market in the form of crystalline grains of weak phenol odor, but strongly astringent taste; easily soluble in water, glycerin and alcohol, forming permanent solutions. In the clinical experiments very good results were obtained by its use as an antiseptic, although the bacteriological experiments were found to contradict this; attention is called to the case of iodoform where the same contradictory status exists.—Dr. Schaerges, *Pharm. Ztg.*, 1892, 489.

A test for sugar in urine depending upon the formation of indigo-blue is proposed by G. Hoppe-Seyler; the test can be applied directly with the urine since the albuminoid and coloring principles do not interfere (more than 2 per cent. albumen, however, interferes, and must be removed by precipitation with lead acetate); the test is carried out with very small quantities of urine, and it is to be regretted that the quantity of sugar cannot be titrated, but must be approximated from the intensity of the blue color. The examination is made by boiling for 15 seconds ten drops of the urine with 5 cc. of the reagent (0.5 gm. ortho-nitrophenylpropionic acid and 1 gm. sodium-hydrate in 100 cc. distilled water); if the test becomes deep-blue at least 0.5 per cent. sugar is present in the urine. Normal urine added to the reagent in large quantity (1 cc.) may produce a green coloration, but a distinct blue coloration is not obtainable.—*Ztschr. f. Physiol. Chem.*, 1892, 83.

Semen Paulliniæ and Pasta Guarana.—Dr. H. Thoms gives the following method of assay for these substances; the method is a suitable modification of Waage's tea assay: An intimate mixture of 10 grams of the finely powdered seeds (or guarana) and 2.65 grams recently slaked lime is mixed with 100 gm. water, evaporated in the water-bath to 60 gm., then mixed with 50 gm. solution of subacetate of lead and 10 gm. fine sand and evaporation continued to dryness; the residue is extracted in a Soxhlet apparatus with chloroform; after distilling off the solvent the crude caffeine is dissolved in warm water, allowed to cool, filtered into a weighed dish, evaporated to

dryness, dried at 100° C. and weighed. The published statements that the drug contains from 3.9–5.0 per cent. caffeine (due to faulty assays) should be reduced according to Thoms' assays to 2.6–3.0 per cent. Prof. E. Schär sometime ago announced that from the acid solution of guarana ether extracted a crystalline substance behaving like morphine in some of its reactions; this same crystalline substance Thoms found to be present in the seeds and therefore to be a characteristic constituent of these two drugs.—*Pharm. Centralhalle*, 1892, 431.

THE CONICAL CORKY SPINES OF ZANTHOXYLUM.

The "Annals of Botany" for July contains an interesting paper by Mr. C. A. Barber, B.A. (Superintendent of the Agricultural Department of the Leeward Islands), on the corky spines of *Zanthoxylum*. The author traces the development of the corky spines of *Z. alatum*, as observed in fresh material supplied by the authorities at Kew. The corky cone appears to rise first as a sort of cushion beneath the thorn. In the earliest stage of its growth it is assisted by a lysigenous gland, which is found at its base. The tissue of this gland is differentiated by the formation of a small area of cells with granular contents, around which the neighboring cells become arranged concentrically, and the number of cells between the vascular ring and the epidermis becomes increased. In a more advanced stage, the cells on each side of the gland become collenchymatous, and the thorn becomes prominent, its cells elongating in the direction of its length. The cells outside the collenchyma then divide and form a meristematic layer at the base of the thorn, the cells nearer its apex becoming rapidly elongated, pitted and thick-walled. The change takes place more rapidly at the surface of the thorn, so that a hard tissue is formed around a softer core.

In the autumn the meristematic cells become sharply marked off from the underlying cells of the cortex, and are much shorter and more closely packed than before, assuming and retaining a brick-shaped character, rapidly taking the appearance of corky tissue, and exhibiting rings of growth, similar in nature and appearance to the rings of growth in the stem of *Pinus*. By the rapid increase of growth of the lower part of the thorn, after the capacity for growth in the epidermal cells has diminished, the tissues around the base of the thorn are ruptured by the tension, and the corky cushion of the

thorn becomes evident. The hardened or upper portion of the thorn soon shows at its base a line of separation, caused by a difference of form and the manner of thickening of the cells in its upper and lower part. A split across the top of the cushion and between it and the base of the spiny portion is thus formed. The latter ultimately separates from its corky base and leaves a scar, or causes a truncated appearance on the top of the corky cushion. In rare cases the spiny portion or part of it may still be seen adhering to the top of the corky cone. Mr. Barber appends to his paper a list of plants, the thorns of which have basal cork formation. This list includes plants belonging to the *Malvaceæ*, *Rutaceæ*, *Simarubeæ*, *Rhamnaceæ*, *Leguminosæ*, *Rosaceæ*, *Araliaceæ*, *Cactaceæ* and *Euphorbiaceæ*.—*Phar. Jour. and Trans.*, Aug. 6, 1892, p. 108.

PLANTS CAPABLE OF YIELDING TANNING MATERIALS.¹

BY F. E. MAFAT.

Algarobilla.—The pods of different species of *Prosopis*, containing 60-65 per cent. of tannin; imported from South America, particularly Chili.—*Leguminosæ*.

Alder (*Betula Alnus*, Linn.).—In Europe *Alnus glutinosa* and *Alnus incana*, and in Japan *Alnus firma*, are indigenous. The bark, leaves and fruit contain 13 to 15 per cent. of tannin; the 36 per cent. given by some authorities may be doubted. The Japanese alder contains 25 per cent. of tannin and colors the leather but little; the European alder is used in Russia and gives a deep color.—*Betulaceæ*.

"*Arbousier*" (*Arbutus Unedo*) grows in Europe; its leaves are used for tanning in Asia-Minor and contain as much as 36.4 per cent. of tannin.—*Ericaceæ*.

"*Airelle-myrtille*" (*Vaccinium Myrtillus*, Linn.).—This plant, more commonly known as bilberry, is abundant in France, Germany and England. Its tannin is rapid in its action, and 3.5 kilos of the dried and ground plant will make 1 kilo of sole leather in a short time. The plant is best pruned like sumac, the leaves are not

¹ From an abstract in the *Journ. Soc. Chem. Ind.*, July, of a prize essay; reprinted from *Phar. Jour. and Trans.*, August 20, 1892.

affected by moisture when gathered, which cannot be said of oak bark.—Ericaceæ.

Alcornoque (*Bowdichia virgilioides* Humboldt), is South American; the root, wood, bark and leaves contained tannin.—Leguminosæ.

Acacia.—Various species of acacia yield the fruit or pods known as balibabalah, cassia grains ("grain de cassier,") bablah, neb-neb and Indian pods ("gousses de l'Inde"). Bablahs were first imported into Europe in 1830 as a mordant; the percentage of tannin in them is from 25–32, according to species. The exporting countries are India, Egypt, Nubia, Syria, Arabia, Senegal and Mauritius. Acacia extract contains a strong free acid, a tannin analogous to that of nut galls and a large quantity of a calcium salt.—Leguminosæ.

Andromeda—Several species grow in Lapland and North America, where they are known as "sour-tree." The wood contains 4–8 per cent. and the leaves 10 per cent. of tannin.—Ericaceæ.

Birch contains a tannin in wood, bark and leaves which colors iron salts green. Davy gives 1.675 per cent. as the tannin contents; Villon, 3 per cent.; Fraas, 5.32 per cent.—Betulaceæ.

Bennet (*Geum urbanum*, Linn.) is wild in Central and Southern Europe; its roots, leaves and flowers are astringent, and according to Tromsdorff contain 42 per cent. of tannin free from gallic acid; others, however, give 4 per cent. in the whole plant.—Rosaceæ.

Bistort (*Polygonum Bistorta*) contains in its roots, stem, flowers and leaves "bistortannic acid" and a yellow coloring matter assimilable by hides; it haunts the marshy land of Southern France.—Polygonaceæ.

"*Behen rouge*" (*Statice latifolia*, Smith) grows in Persia, the Caucasus, etc. Its roots are used in Southern Russia as tan for skins, to which it imparts a dull, ochreous, red color.—Plumbaginaceæ.

"*Bois doux*" (*Inga vera*, etc.) is a tree of Mexico, Guadeloupe and the Indies, where it is known as cooroocoopully; its wood and bark are tanniferous.—Leguminosæ.

Bauhinia (*Bauhinia variegata*) grows in the Antilles and Central America; its wood and bark contain tannin.—Leguminosæ.

Bearberry (*Arbutus Uva-ursi*, Linn.) grows in France, Italy, Spain and Russia, and contains 14 per cent. of tannin in its leaves, accord-

ing to some authorities, and 36.4 per cent. according to others.—Ericaceæ.

Oak (Quercus).—There are seventy to eighty species of oak, comprising 275 varieties, about half of which inhabit the old world and half the new world. The hard oak dominates in Europe, and of its two varieties, *Quercus pedunculata* and *Quercus sessiliflora*, the latter has the bark, which is richer in quercitannic acid. Of other oaks, the following are given: *Q. Tauza*, 8 per cent. of tannin in its bark; *Q. Cerris* (hairy-cupped oak), 10 per cent. of tannin in bark; *Q. Ilex* (evergreen oak), 10 per cent. of tannin in bark; *Q. Suber* (cork oak), 10 per cent. of tannin in bark; *Q. Ballota*, 10 per cent. of tannin in bark; *Q. Mirbeki*, 12 per cent. of tannin in bark; *Q. coccifera* (kermes oak), 15 per cent. of tannin in bark; *Q. Ægilops* (valonia), 3 per cent. of tannin in bark; *Q. insectoria*; *Q. glomerata* (Russian oak). The above are African and European. Of American oaks may be mentioned: *Q. alba* (white oak), 7.85 per cent. of tannin in bark; *Q. tinctoria* (black oak), 6.47 per cent. of tannin in bark; *Q. rubra* (red oak), 5.55 per cent. of tannin in bark; *Q. coccinea* (scarlet oak), 7.78 per cent. of tannin in bark. It may be generally stated that oak bark contains from 7 to 18 per cent. of quercitannic acid, while the wood and leaves contain 5–7 per cent.—Cupuliferæ.

Chestnut (Castanea vesca), abundant in Southern Europe and North America; the wood contains 68 per cent. of water when felled, 43 per cent. three months after felling, the bark being left on, and 35 per cent. five months after sawing and stripping. The wood and bark contain 4 to 12 per cent. of tannin (castanea tannic acid).—Cupuliferæ.

Cornelian cherry (Cornus mascula, dogwood) grows in Europe, especially France; its bark, leaves and fruit contain 19.9 per cent. of tannin according to Gassincourt, and 8–9 per cent. in the bark according to some other analysts.—Cornaceæ.

Carob (Ceratonia Siliqua, Linn.) grows in Spain, Italy, France, Algiers and Egypt. Its fruit (St. John's bread) contains 50–55 per cent. of tannin.—Leguminosæ.

Carob of Judæa (Pistacia Terebinthus, Linn.) grows in the Levant, and gives rise to horn-shaped galls which contain 25 per cent. of tannin, and are called "caroubes."—Anacardiaceæ.

Conocarpus arborea and *C. racemosa*.—West Indies and Brazil;

its bark and fruit contain tannin. Its indigenous name is "mangle."
 —Combretaceæ.

Catechu.—The brownish-red catechu of Bengal is the exudation from the *Acacia Catechu* (Leguminosæ). The Bombay brown catechu is from the *Areca Catechu* (Palmeæ)—the areca palm. Gambier is the extract from the leaves of *Uncaria Gambier* (Rubiaceæ). To Bengal catechu have been ascribed of tannin 54.5 per cent. (Davy), 38.2 per cent. (Renard) and 48 per cent. (Villon). To Bombay catechu, 48.5 per cent. (Davy), 54.5 per cent. (Renard) and 55 per cent. (Villon). To gambier, 58 per cent. (Davy), 38–40 per cent. (Renard) and 65.79 per cent. (Villon). Catechutannic acid (mimotannic acid) colors iron salts green.

Canaigre (*Rumex hymenosepalum*, Linn.) grows wild in the marshy lands of the southeast of the United States; its bulbs contain 20–24 per cent. of tannin. Most other varieties of rumex also contain tannin.—Polygonaceæ.

Paraguay acacia (*Curupay*), of South America, contains 16–20 per cent. of "curupatannic acid."—Leguminosæ.

Divi divi (*Cæsalpinia Coriaria*), chiefly from Mexico and Venezuela, contains ellagitannic acid to the extent of 30–45 per cent.; it imparts a reddish brown color to leather.—Leguminosæ.

Eucalyptus (*Eucalyptus resinifera*) is used in New Caledonia, where it grows, as a tanning agent; the tannin in its leaves is estimated at 10–12 per cent.—Leguminosæ.

Fustic, young (*Rhus Cotinus*, Linn.) grows in Southern Europe, and contains a tannin which colors iron salts olive green.—Terebinthaceæ.

Spiræa (*S. Filipendula*, Linn.) has astringent flowers and roots.—Rosaceæ.

Strawberry (*Fragaria vesca*, Linn.).—The flowers and roots are astringent.—Rosaceæ.

Pomegranate (*Punica Granatum*).—The bark of this tree was used by the ancients as a tanning agent under the name "malicorium;" Davy attributes 18.8 per cent. of tannin to it. The shell of the fruit contains 22–25 per cent. of tannin, and is used for tanning in Japan; the wild pomegranate contains 46 per cent. of tannin.—Granateæ.

"*Gonakié*" (*Acacia Adansonii*), or red gum, yields very tanniferous fruit, which is used as a tannage in West Africa.—Leguminosæ.

Kino is the dried exudation or extract of several plants, of which the principal are : *Dipterocarpus erinaceus* (Africa), *Butea frondosa* and *B. superba* (N. India), *Pterocarpus Marsupium* (India), *Coccoloba uvifera* (Jamaica), and *Rhizophora Mangle* or mangrove (Mexico), whose leaves contain 18–20 per cent. of tannin ; the first four are of the Leguminosæ. *Kino* contains 45–55 per cent. of “coccotannic acid.”

Mastic (*Pistacia Lentiscus*, Linn.).—The leaves and bark contain 10–12 per cent. of tannin ; used for tanning buffalo skins in certain countries. —Terebinthaceæ.

Mimosa.—The *minosæ* include a great many varieties of acacia ; the most valuable bark is from Tasmania ; the Australian produce contains 25 per cent. (*A. cyanophylla*)—45 per cent. (*A. pycnantha*) of tannin ; *A. sentis* (6.32 per cent.) and *A. binervata* (30.40 per cent.) are from New South Wales.

Myrobalans, the fruits of several species of *Terminalia* (Combretaceæ ;) their contents of tannin are variously given, 18.2 per cent. and 52 per cent. being the extremes ; Loewe asserts the invariable presence of ellagic acid ($C_{14}H_{10}O_{10}$).

Galls are classified as European and Asiatic, of the latter there are Levant galls and Aleppo galls. The Levant galls contain 77.42 per cent. of gallotannic acid (Müller) ; the Aleppo galls contain 60–66 per cent. (Fehling). Villon gives the following for Aleppo and Levant galls : Black, 37–41 per cent. ; green, 53–60 per cent. ; white, 50–65 per cent. For Smyrna galls he gives : Black, 33–37 per cent. ; green, 53–60 per cent. ; white, 60–63 per cent. Renard gives 33–60 per cent. as a mean of all three kinds. Mierzinsky gives 60–66 per cent. as a mean. Of European galls, those of Morea and Istria are the best, and have some 40 per cent. of gallotannic acid ; Italian and Hungarian galls follow, and those of Germany and France are least important. French galls contain 9–10 per cent. of tannin ; German galls, according to Villon, contain 18–19 per cent. of soluble and 13–14 per cent. of insoluble tannin. Chinese and Japanese galls are from plants belonging to the terebinthaceæ, viz : *Rhus semialata* in China and *Distilium racemosum* in Japan ; 69 per cent. is the mean of the many versions which have been given of the tannin in Chinese galls. Hungarian galls or “knopperrn” are from oaks, and contain 20 to 35 per cent. of tannin. Bassorah galls are from an oak and contain 57 per cent. of gallo-

tannic acid according to Kathreiner, Eitner and others. Renard gives 27 per cent. and Villon 30 per cent., of which 3 per cent. is difficultly soluble. Bokhara galls are from the Indian tamarisk (terebinthaceæ); their percentage of tannin has been variously given from 26 per cent. to 50 per cent.

Osier (*Salix viminalis*) contains 7–10 per cent. of tannin in its bark, which is largely used in Northern Russia.—Salicaceæ.

Quebracho comes from nearly all the Eastern States of South America (source of aspidospermine); red quebracho (*Loxopterygium Lorentzii*) contains 16–22 per cent. of “aspidospermic acid,” while white quebracho (*Aspidosperma Quebracho*) only contains 10–11 per cent. At the Paris Exhibition of 1867, leather tanned with quebracho was shown for the first time in Europe, and in 1874–75, the utility of this wood became recognized in France. In whatever form quebracho wood is to be used, exposure to air should be avoided as much as possible; a sample which had a titre of 20 per cent. of tannin when freshly cut was found to contain only 16 per cent. after six months’ storage.

Red rhatany (*Krameria triandra*.—Polygalaceæ) grows in Argentina, Brazil, Chili and Alsace; its bark contains “rhatania-tannic acid.” The dried extract is with difficulty distinguished from kino; the bark, however, contains 42.5 per cent. of tannin, while kino averages 50 per cent.

Pine.—The bark of *Pinus Picea* (Linn.) contains 6–7 per cent. of a variety of pitannic acid. *Pinus canadensis* (Linn.) is the hemlock (white spruce) so much used as tannage in the United States; the bark contains 8–10 per cent. of tannin. The bark of *Pinus abies* (Linn.) contains 7–8 per cent. of tannin. Villon found 25 per cent. of tannin in the inner bark of *Pinus Aleppensis*, 3 or 4 per cent. in the outer bark, and 7 per cent. in the cones.

Larch (*Larix europæa*) bark contains 1.66 per cent. of tannin according to Davy, and 5.8 per cent. in springtime according to Müller. There is no tannin in the wood of any of the Coniferæ.

Sumac is from several species of *rhus*, of which *Rhus coriaria* is the chief. The percentage of tannin in various sumacs is from 10–28.2 per cent.

Tormentilla reptans and *T. erecta* (Rosaceæ), wild in the Alps and Pyrenees, are employed as tannage in the Faroe Islands, where they produce a red leather. They contain tannin in the flowers

and roots to the extent of 31 per cent. according to Renard ("tormentillo-tannic acid") and of 17 per cent. according to others.

Willow.—The various species of *salix* (Salicaceæ) contain tannin in the bark and leaves; in the former it varies greatly, 1.4 per cent. and 16 per cent. having been found in different instances. Willow bark has long been used by tanners in Russia.

Mountain Ash (*Pyrus aucuparia*, Rosaceæ) contains 5–7 per cent. of tannin in its bark, 3.5 per cent. in its wood, and some also in its leaves and fruit.

Valonia, *Quercus Ægilops* (Cupuliferæ).—These well-known acorn-cups contain from 25 to 45 per cent. of tannin. The main varieties are: *Chamada*, 33.4 per cent., *Chamadina*, 35.4 per cent. and upwards, *Rabdistia*, 30 per cent. and *Chondra*, 27 per cent. Powdered valonia is poorer in tannin than the cups, because before grinding the bark and wood chips are not completely separated.

ANALYSIS OF BEESWAX.¹

BY C. MANGOLD.

Owing to the great fluctuation of the acidity, saponification and iodine numbers of genuine yellow beeswax, adulteration with less than 6 per cent. of paraffin or ceresin is almost beyond detection. A process has been worked out by A. and P. Buisine, which the author thought was well worth trying. It is based on the decomposition of wax soap by hot potash-lime, which does not act on the paraffins, but decomposes the fatty matter with elimination of hydrogen, which serves as a measure of their amount. The paraffins may be extracted from the residue.

The author's investigations practically confirm those of Buisine, but he now recommends the following process: 2 to 10 grams of the wax is saponified by melting it with powdered potash-lime, the reaction being aided by stirring with a glass rod. After complete cooling, the soap is powdered, and intimately mixed with three times its weight of potash-lime, and the powder transferred to a thick-walled, pear-shaped bulb-tube, which is heated for three hours at 250° in a mercury bath contained in an iron vessel. This is provided with a lid, which screws on air-tight, and is pierced with four

¹Chem. Zeit., 15, 799; Jour. Chem. Soc., 1892 p. 1034.

apertures through which pass air-tight, respectively, the pear-shaped bulb, a thermometer, a thermostat, and a long tube open at both ends to condense any mercury vapor. A tube connects the pear-shaped bulb with a Hofmann's burette, in which the hydrogen is measured.

The author's process is, however, more particularly directed to the estimation of the paraffins. After three hours, when no more gas will be given off, the residue is powdered, and to prevent any loss the bulb-tube is also broken up, and the whole is extracted with light petroleum in a Soxhlet's apparatus. The petroleum is distilled off, and the residual paraffin dried at 110° and weighed. On applying the process to yellow beeswax of undoubtedly genuine origin, the amount of natural hydrocarbons was found to vary from 11.02 to 14.7 per cent., although in practice the average amount may be put down as 13.5 per cent.

A sample of Transylvanian wax, tested by the author, had an acidity equivalent of 16.66, and a true saponification number of 56.02, which pointed to adulteration with paraffin, or a similar substance. Analyzed by the author's method, the percentage of hydrocarbons came, indeed, to 28.12, corresponding with 17 per cent. of adulteration, calculated on the original sample. A sample of wax, which had been purposely adulterated with 8 per cent. of paraffin, showed on analysis 7.4 per cent.

The amount of hydrocarbons in samples of white wax varied from 10.93 to 15.48 per cent., but the purity of some of the samples was rather doubtful.

THE ASSAY OF JALAP.

By F. H. ALCOCK, F.I.C.

Numerous papers have appeared in the Journal from time to time on the subject of jalap and matters connected with it.

It is not, however, so much upon the quality of the drug and amount of resin which it contains that I wish to deal in this note as to give an easy method of ascertaining the quantity of resin in the drug or its preparations.

The official process and its many modifications do not appear to give entire satisfaction, and the conclusion I have come to after many trials is that the following process may prove to be in several ways more acceptable to pharmacists. It depends upon the great

solubility of jalap resin in amylic alcohol, and the comparatively small solubility of amylic alcohol in water, and is as follows: One gramme of powdered jalap—free from agglutinated lumps—is placed in a suitable bottle, and 20 cc. of amylic alcohol are added and shaken well from time to time. After a few hours strain the liquid off through a little cotton wool into a glass separator, wash out the bottle with 5 cc. amylic alcohol and place the washings on the marc in the funnel, repeat with 5 cc. more if necessary so as to ensure the presence of all the resin in the separator.

Now, shake up the amylic solution of the resin with small quantities of water at 50° C. (equal measures of hot and cold water will do), set aside for the liquids to separate, remove the lower aqueous layer, and repeat the washing with water until nothing more of a non-resinous nature is removed. Afterwards transfer the solution of the resin to a weighed dish containing 10 cc. distilled water, wash out the separator with a little amylic alcohol, placing the washings in the dish, evaporate on a water-bath in the usual way, and when dry, weigh.

The advantages of this method are:

(1) That less of the water-soluble matter is removed than by the official process.

(2) After careful treatment with the amylic alcohol no resin remains, rectified spirit dissolving from the residue only water soluble matters and no resin.

(3) It is a cheap process because common fusel oil once distilled can be used, but in this case more water-soluble matter is removed and more washing required.

The use of the water when evaporating off the amylic alcohol is to prevent the alcoholic solution creeping over the sides of the dish and consequent loss of resin.

As the vapor of amylic alcohol is not a pleasant one to inhale, the evaporation is best conducted under a good flue.

An examination of many samples of commercial powdered jalap sold in Birmingham and district confirms the often expressed opinion that the official standard of 10 per cent. of resinous constituents is too high at the present date.—*Phar. Jour. and Trans.*, August 6, 1892, p. 107.

BRITISH PHARMACEUTICAL CONFERENCE.¹

TWENTY-NINTH ANNUAL MEETING AT EDINBURGH.

In accordance with the custom that has become established, the proceedings commenced on Monday evening, August 22, with a reception of visitors, in the Waterloo Rooms, by the President, Mr. E. C. C. Stanford, who was supported by several other officers of the Conference and by the members of the Local Committee.

At the first general meeting on Tuesday there was a very large attendance. The members of the Conference were welcomed by the Lord Provost, and after the usual exchange of mutual compliments the list of delegates was read.

The report of the Executive Committee was then read by the senior Honorary Secretary. It was very brief, and even less cheering than that of last year, the first point mentioned being the continued disappointment experienced by the Committee at the inability to record an increase in the membership of the Conference, notwithstanding the special efforts which have been made in that direction, during the last few years, with the view of maintaining the position of the Conference as a representative organization. The report continued by stating that the Executive Committee has met on various occasions during the past year and that, among other business dealt with, the suggestion of concurrent meetings of the Pharmaceutical Society and the Conference in provincial centres has been considered, though without any apparent prospect of advantageous issue. Mention was made of the severe loss sustained by the death of Emeritus Professor Redwood, a former President and active participator in the work of the Conference, and by the death of Mr. Thomas Hyde Hills, a former Vice-President and liberal promoter of the welfare of pharmacy. The report also stated that a further grant has been made to enable Mr. Cripps to continue his investigation of ipecacuanha, and that earlier publication of the "Year-Book" for 1892 may be hoped for, since a considerable part of the manuscript is now in the hands of the printers. It was also stated that sixty new members had been elected at the meeting of the Executive on the previous evening.

As the Conference does not aspire to becoming a wealthy body, the particulars of its financial affairs do not require great elaboration: and on the present occasion the Financial Statement read by the Treasurer, Mr. R. H. Davies, presented much the same items of expenditure as is usually the case.

The President then proceeded to deliver his address. Reverting to the inauguration of the Conference twenty-nine years ago by twenty-one pharmacists, who were then attending a meeting of the British Association, and to the rapid progress the organization had made between that time and the meeting held in Edinburgh in 1871, he proposed, by looking backwards, to trace the general progress that has been made by the world during the period the Conference has been in existence, with the object of inquiring whether pharmacy has kept pace with that general advancement. Before entering upon such a retrospect it was, however, natural that reference should be made to the gaps which have been left in the ranks of the Conference by the deaths of

¹ From *Pharmaceutical Journal and Transactions*, August 27.

Daniel Hanbury, Henry Deane, Brady, Stoddart, William Southall, John Mackay, John Williams, T. H. Hills, G. W. Sandford, and Redwood, for the sake of offering an affectionate tribute to their memory. But serious as these losses have been, the spirit of those who are gone still animates their survivors. There is still on their part the same desire to maintain the British Pharmaceutical Conference as an organization for the encouragement of pharmaceutical research and the promotion of friendly intercourse among pharmacists. In these respects the President claimed that the Conference has, in the past, amply fulfilled its promises, by furnishing a stimulus to investigation and by promoting feelings of mutual respect and esteem, not only among British pharmacists but also between them and their colleagues of every nationality. Proceeding to deal with the various features of national progress during the lifetime of the Conference, the speaker pointed out that within this period the trade of the country, as shown by its exports and imports, has nearly doubled: the parcel post, the sixpenny telegram, the modern practice of photography, the telephone, phonograph, microphone, and the typewriter have come into existence. While thirty years ago the first Atlantic cable was lying useless at the bottom of the ocean, there are now seven transatlantic telegraph lines in constant use. Within the same period town tramways have been introduced, the capital of railways has been more than doubled, and the annual number of their passengers has increased from 204 millions to 877 millions. By numerous inventions within the same period the rate as well as the safety of travelling by rail or steamships have been greatly increased. Immense economy has been effected in the use of coal as a source of motive-power, and by the extended use of gaseous fuel many branches of manufacture have been greatly improved. Electricity bids fair to become the source of light in the future, and for its production the enormous store of motive-power in running water is being utilized. By the care that has been exercised in preserving public health, the national death-rate has been marvellously reduced and the dangers of epidemic diseases have been mitigated. Since the time when the first meeting of the Conference was held the whole aspect of chemistry as a science has been changed, and, by its application, new branches of manufacturing industry have been created. The alkali trade has been almost revolutionized, and the cost of its products very materially reduced. Waste products that were formerly a source of nuisance and serious detriment to health and property have been made sources of profit even greater in some instances than the main products formerly obtained. In this way the hydrochloric acid and the "waste" of alkali works are now turned to useful account, and thousands of tons of ammonia are obtained from the waste gaseous products of shale oil works, smelting furnaces, etc., in addition to that furnished by gas works. As an incidental result of the application of scientific principles to the condensation of volatile hydrocarbons by refrigeration, there has grown up an enormous trade in the importation of dead meat from abroad, amounting last year to nearly three and a-half million carcasses of frozen mutton, which were brought through the tropics and landed here in sound condition. Thirty years ago the tar of gas works could scarcely be got rid of, and at Edinburgh it was for a long time buried in the Musselborough sands at low water. Since that time it has become, like Aladdin's lamp, the source of almost fabulous wealth in money, in colors, and even in medicinal agents which go far to suggest that

Bishop Berkeley's almost forgotten laudation of the virtues of tar was a true prophecy. The extent to which this wonderful industry has developed is illustrated by the fact that the value of the coal-tar colors produced in the year 1878 amounted to no less than three millions sterling. Of that quantity two-thirds was produced in Germany, and though almost the whole of the raw material has been supplied from England, while the markets for the finished products are chiefly Bradford and Manchester, the superior science of German chemists has enabled the manufacturers of that country to establish a virtual monopoly of this industry, just as the English market in chemicals of all kinds is being taken possession of by German producers. Although this striking illustration of the way in which certain branches of British manufacturing industries have been placed at a disadvantage and forced into the background points to a deficiency which is only beginning to be recognized, it was pleasant to hear Mr. Stanford state that during the period now referred to there has been greater progress in the matter of education. There would be real ground for regarding that progress with satisfaction if it were the case that it had extended over the entire field of educational work. But the progress made has been almost exclusively confined to the primary education under school boards, and its beneficial effects, great as they will no doubt prove to be, have been restricted to the working classes. In all that relates to secondary, technical and university education, the progress in Great Britain has been towards a condition of relative barbarism. While Germany, with its twenty-three universities and various other means of promoting the cultivation of science so as to make it useful and a matter of familiar every-day appreciation by the public, is now enjoying in all branches of industry the well-earned fruits of patient labor during the past century, Great Britain has only eight universities deserving of the title, and of those four belong to Scotland, the entire population of which is not equal to London alone. It is to the educational poverty of this country in these directions that we must look for an explanation of the fact that we are being outstripped by competitors who actually did not enter upon the field of industrial enterprise until a few years before the British Pharmaceutical Conference was founded. Thanks are due to Mr. Stanford for having in his address so prominently directed attention to the prevailing deficiencies in regard to secondary and scientific education, and to the urgent necessity for their being efficiently remedied. At this point of the retrospect a question naturally arises as to what has been done to advance pharmaceutical education, and though Mr. Stanford generously expresses the opinion that it has kept pace with progress in other directions, the facts which he mentions are decidedly not in accord with the opinion he put forward. On the contrary, the statements contained in the recent report made by Dr. Stevenson, as the Government Visitor of Examinations, are directly opposed to the opinion that there has been much real advance in pharmaceutical education. What has been done is the result of individual effort and voluntary action. It has been hitherto altogether insufficient to lighten the mass of the pharmaceutical body or to justify the assumption that we have at the present time anything approaching to an adequate system of pharmaceutical education. In this respect there has been but little advance beyond the position that obtained when the British Pharmaceutical Conference met at Edinburgh in 1871. On that occasion it was well pointed out by a shrewd Scottish member

that not only should master pharmacists be able to instruct their pupils, but those pupils should be in condition to be instructed. It is impossible to read the reports of the Government Visitors of Examinations, and especially those of Sir Douglas Maclagan, without being impressed by the painful conviction that this is not the case, and that the majority of the youths who have entered the business of pharmacy have not been in a condition to be instructed in the practice of the calling they aspire to, or in the scientific principles upon which it is based. And yet upon the very same occasion it was admitted that if practical pharmacy is to arrive at anything like perfection, it must be upon a scientific basis. Under such conditions it is worse than folly to complain that there is over-education in pharmacy. It is culpable blindness to do so. The real fact is that pharmaceutical education, such as it is, is to a great extent spurious. So long as such a condition continues there can be no hope of sound and general improvement in the practice of pharmacy. That is opposed by an influence akin to the "Chinese cheap labor" deplored by Mr. William Nye. It is not, therefore, remarkable that Mr. Stanford discreetly abstained from answering the question he had propounded as to how far pharmacy in this country has kept pace with general progress. The answer could scarcely have been encouraging. The account given by Mr. Stanford of evils which the better class of pharmacists have to contend against is sufficiently formidable. The competition of limited liability companies and co-operative stores, the invasion of the chemist's special province by the illegal sale of poisons, the irregular business carried on at the open shops of doctors or under their cover, and the trade in proprietary medicines are, no doubt, all serious evils. But, in some respects, they have been brought into existence or promoted by those who complain of their prejudicial influence. In the case of proprietary medicines, for instance, which no less appeal to the gullibility of the "thirty millions, mostly fools," constituting the British public, than tiger's bones do to Chinese credulity, chemists have themselves contributed largely to the increase of their popularity. In regard to these articles we cannot agree with Mr. Stanford's suggestion that they should be really made the subject of letters-patent. Such a proceeding would give them the authoritative recognition which they are now wholly destitute of. The idea of abolishing the stamp duty on these articles appears to be equally a mistake. By that means they would be relieved from the imposition of a tax that was intended to and does, to some extent, restrict their sale. We fail altogether to perceive what possible good would accrue either to the pharmacist or to the public from the adoption of either course. It is probably impossible for legislation to counteract the effect of "bold advertisement" or to lessen its influence upon public credulity. The only remedy open to the pharmacist appears to be that of refusing to be an agent for the distribution of these articles, and that, perhaps, is more than can be expected. So far as illegal sale of poison is practised under cover of the secrecy maintained as to the composition of proprietary articles, there is reason to believe that this practice will before long be put a stop to, and that the dangers arising from concealed distribution of narcotic and other poisons, in the form of proprietary articles liable to medicine stamp duty, will cease to exist. The consequent appropriate regulation of the trade in such dangerous articles will tend to satisfy the demands which have so long been urged by coroners and by the medical profession in the public interest.

Want of space prevents further reference to several other interesting features of Mr. Stanford's Presidential Address, but we commend it to the careful perusal of all who are interested in pharmaceutical affairs, as being replete with information and matter for reflection. At the conclusion of the address a vote of thanks to the President, moved by Mr. Reynolds and seconded by Mr. Boa, was put to the meeting by Mr. Groves, and carried by acclamation. The report of the Unofficial Formulary Committee was then read by Mr. Martindale, stating that during the past year there had been little material for investigation, but that the Committee has work in hand for the future.

The reading of papers was then proceeded with. The notes on *Starch Digestion*, by Mr. G. A. Grierson, had reference to the relative digestibility of different kinds of starch, and gave an account of some experiments conducted by the author with a view of determining the differences in this respect. The result at which he arrived was that *tous-les-mois*, arrowroot and potato starch, are more readily converted by starch digesting ferments than the starch of wheat, maize, oats, or rice, the starch of roots being generally more digestible than that of seeds. The method adopted for testing was to boil a gramme of the starch or meal with water, making up the volume of liquid to 100 cc., then adding 1 cc. of pancreatic essence to the mucilage, and noting the time which elapsed before a drop of the mixture ceased to give a blue color with a dilute solution of iodine. In the case of *tous-les-mois*, this was ten minutes, and a similar result was obtained with arrowroot and potato starch. With the starch of wheat and rice a distinct blue coloration was produced after two hours' digestion, and in the case of maize starch a blue color was produced after a much longer time. Prolonged boiling of the mucilage was not found to affect these results. Similar differences were observed when malt extract was used instead of pancreatic essence. The author is of opinion that his observations confirm Cripps' recommendation of potato starch or arrowroot for use in testing the digestive efficacy of malt extract. Temperature was found to have some influence upon the time of digestion, the change being most rapidly effected at 100° F. Above that temperature the digestion of starch was much lower. On varying the dilution of the starch mucilage it was found that the stronger mucilage was digested more rapidly than weaker; this result being probably due rather to the dilution of the digestive ferment. On adding to the mixture of starch mucilage, and pancreatic essence, a small proportion of hydrochloric acid, the conversion of the starch was very considerably retarded; a fact which the author regards as pointing to the probability that some forms of dyspepsia may be due to low alkalinity of the pancreatic juice and its consequent inability to neutralize the acid contents of the stomach when they are emptied into the duodenum. The addition of sodium carbonate to render the starch mucilage slightly alkaline had a similar retarding influence upon the conversion of the starch. However, no such retarding effect was found to be produced when alcohol was added to a mixture of starch mucilage and pancreatic essence. It was noticed in the course of these experiments that the tint produced with iodine by different kinds of starch differs considerably, and that with some a larger proportion of iodine is required to obtain the same degree of coloration than with others. Mr. Grierson considers that this circumstance points to the presence of a reducing body in some kinds of starch which require larger quantities of iodine to produce an equally deep blue color.

ation. In the discussion of this paper Mr. Gerrard mentioned that he had found 125° F. the best temperature for digestion, and that in the case of meat the change was more rapid in proportion to the subdivision of the meat and the greater degree of dilution. Some doubt was thrown upon the iodine test by Mr. Dott, who preferred the method of determining the sugar produced.

The Electro-magnetic Current in Strychnine Poisoning.—Mr. James Mackenzie described his experience of its successful application to a dog that had been poisoned with strychnia. The animal had probably taken about a grain of strychnine and presented unmistakable symptoms of strychnine poisoning, but directly the current was applied to the spinal column its beneficial effect was evident, the muscular rigidity subsiding, and at the end of four hours the dog was sufficiently recovered to be able to walk home. In subsequent experimental trials with dogs under various conditions the same result was obtained, and Mr. Mackenzie suggests that this method of counteracting the effects of strychnine in cases of poisoning is worthy of further investigation.¹ Mr. Martindale suggested that hypodermic injection of apomorphine would be the most effectual antidote, but this was objected to by Mr. Gerrard as impracticable on account of the violent convulsions produced by strychnine. Mr. Groves mentioned that he had found repeated doses of chloral had a beneficial effect in cases of poisoning by strychnine, and Mr. Atkins stated that he had seen the galvanic current applied without success. In reply, Mr. Mackenzie said that apomorphine was not known at the time his experiments were made, and that he had brought the subject forward in order that it might be investigated, as the method might enable chemists to act in cases of emergency.

The Purity of Lithium Salts.—Mr. Wm. Mair examined samples of commercial carbonate and citrate of lithium. On converting the carbonates into sulphates and carefully purifying, he found that two out of seven specimens were free from impurity whilst the others contained minute traces of sodium, calcium, or magnesium carbonate. It was concluded that commercial carbonate of lithium, as now supplied, is reasonably pure and free from added extraneous matter. Seven samples of the citrate yielded very similar results, only two being chemically pure. None of the material examined was of German origin, and Mr. Mair suggests that home manufacturers might with benefit devote greater attention to perfecting the purity of chemicals used in pharmacy. Whilst admitting that certain British firms do maintain a high standard, the desirability of securing a general adherence to this standard was insisted upon. In reference to the remark concerning pure chemicals, Mr. Tyrer said that manufacturers were prepared to meet any demands provided buyers would pay the prices which pure articles must of necessity bear, but purity could not be expected while they were subject to competition with inferior articles.

Valerianate of Zinc.—Mr. W. A. H. Naylor has found time, in addition to performing his multifarious duties as senior Honorary General Secretary to the Conference, to conduct an investigation of the commercial varieties of valerianate of zinc. He procured seven samples, variously denoted as crystal-

¹ One of the earliest instances of the successful use of the electro-magnetic current in a case of accidental strychnine poisoning was reported in the Amer. Jour. Phar., 1855, p. 557.—Editor.

lized, B. P., or precipitated, and compared them with an experimental one prepared by himself, according to the official process, from chemicals of commercial quality. The results arrived at show that the valerianate of zinc used in medicine is not of uniform composition and does not meet the official requirements, the precipitated varieties being worst in this respect; further, that the valerianic acid used in the process of manufacture is prepared from an imperfectly purified fusel oil. It is suggested that the present Pharmacopœial test might well be amended to the extent of specifying the percentage of residue that should be left on ignition of the salt after being moistened with nitric acid, and 26 per cent. is proposed as the minimum. Mr. Hodgkin said that in regard to each article, their relative purity is entirely a matter of price, and it was generally agreed that more thorough definition of the acid in valerianate of zinc was desirable.

Animal Charcoal.—Mr. J. Hodgkin's paper on *Carbo Animalis Purificatus* is a brilliant example of the manner in which even apparently simple matters should be dealt with. In a most thoroughly practical paper he shows that it is impossible to prepare this substance so that the pharmacopœial requirements may be met, and that, were this hypothetical preparation of the B. P. in existence, it would be useless as well as costly. Mr. Hodgkin gives detailed instructions for the preparation of a good purified animal charcoal, and his paper may be taken as a type of what reports of such investigations should be. The President and Mr. Tyrer confirmed the statement as to the difficulty of supplying the B. P. preparation.

Strychnine Salts.—Mr. D. B. Dott has confirmed the results obtained by Mr. G. Coull in investigating the solubility of strychnine acid sulphate, and he emphasized the unsuitability of this salt for the preparation of hypodermic injections. He finds, too, that the neutral tartrate is but little better as regards solubility. The tribasic citrate is more soluble (1 in 37), and the hydrochloride still better (1 in 35.5). The conclusion drawn is, that, giving due regard to solubility, stability and neutrality, the latter is the best and most useful salt of strychnine for pharmaceutical purposes.

Eucalyptol.—Mr. R. H. Davies gave the results of the supplementary investigation conducted by himself and Mr. T. H. Pearmain in connection with eucalyptol from eucalyptus oils. They have obtained what they regard as a practically pure product, and are inclined to consider that it should be free from any characteristic odor and possess no rotary power.

At the close of the business proceedings on Tuesday the members were conveyed in carriages to Rosslyn to visit the celebrated chapel, and after partaking of tea at the adjoining hotel they returned to Edinburgh.

In the evening the President of the Conference and those officially connected with it and with the Pharmaceutical Society were entertained at dinner by the Chairman and Vice-Chairman of the Local Committee, and a very pleasant evening was passed.

Ointment of Red Oxide of Mercury.—In a note upon this ointment, Mr. F. Davis suggested that the frequently lumpy condition of this ointment is probably the result of a separation of the hard paraffin in consequence of too rapid cooling in its preparation, and that the Pharmacopœia direction to "mix the whole thoroughly" is not sufficiently explicit. He, therefore, recommends that the vessel in which the ointment is made should be placed in warm

water, and that the ointment should be occasionally stirred while cooling as a means of obviating the defect of lumpiness.

Podophyllum Emodi.—Mr. John C. Umney shows that the resin obtained from it yields a much smaller proportion of crystalline picropodophyllin, upon which its activity is supposed to depend, than does that prepared from *P. peltatum*. The Himalayan drug would, therefore, appear to be unsuitable as an alternative source of podophyllin resin prepared according to the official process.

Grape Sugar Estimation.—Mr. A. W. Gerrard points out that when Fehling's solution is made with a double amount of copper sulphate, and 100 cc. of it is treated with 3.3 grammes of cyanide of potassium, it retains its original sugar value, but during reduction gives no precipitate except on the disappearance of the blue color. The end reaction is, therefore, sharp and more exact than is the case in the ordinary Fehling's test.

Potassium Bromide.—Mr. Dott considers that the official tests for potassium bromide are fairly complete, but that the volumetric test with argentic nitrate is not by itself capable of determining the purity of a sample with accuracy. He finds a considerable variability in the composition of the commercial salt, and suggests that an additional test should be introduced into the Pharmacopœia, fixing a limit to the percentage of silver salt yielded by precipitation, and specifying a minimum percentage of loss on fusing the same in a current of chlorine.

Jambul.—An interesting paper by Mr. Thomas Stephenson, of Bombay, on Jambul and its influence on the action of diastatic ferments was read. This drug has been used as a remedy for diabetes sometimes with marked success, while at others it has completely failed, and it was with the object of ascertaining the cause of this discrepancy that Mr. Stephenson's experiments were made. On the assumptions that the efficacy of the drug consists in its power to arrest the action of diastatic ferments upon starch, and that its age, as well as the process employed in making medicinal preparations from it, may have an influence upon its therapeutic activity, comparative experiments were made with old and fresh seeds, and with liquid extracts prepared with and without the application of heat. It was found that the best result was obtained with the fresh kernels, and with a preparation which had not been subjected to the action of heat. The pericarp was found to have a much more feeble action than the kernel even when fresh. The method of testing adopted was to mix a definite quantity of starch mucilage with 2 grammes of malt extract, adding the different preparations of jambul, and then keeping the liquids at a temperature of 96° to 100° F. for two hours. The sugar was then determined by means of Fehling's solution. Mr. Stephenson is of opinion that the differences of the results thus obtained furnish an explanation of the discrepancies which have been observed in the use of jambul as a remedy for diabetes. As a practical result he suggests that a medicinal preparation of jambul should be made of the fresh seeds, discarding the pericarps and avoiding the application of heat. He finds that a weak alcoholic menstruum extracts the active constituents and gives a stable preparation, and he suggests that the process of re-percolation might be employed with advantage in the case of this drug. He also recommends that the therapeutic value of preparations of jambul should be tested on the lines laid down in his experiments.

The Alkaloid of Tea.—In this paper Mr. Allen stated that theine could be dried without loss of weight at 100° C., and that it undergoes decomposition when boiled with lime water. He recommended that in the analytical determination of theine, tea should be first extracted with water, and that after titrating the extract with lime or magnesia, the theine should be dissolved out of the dried mixture with alcohol. In the discussion of this paper it was remarked that the points which were beyond dispute had already been made known, and that in several respects the statements made were at least questionable.

Chloroform.—Mr. D. Brown discussed tests for the purity of chloroform, and gives exhaustive tables to show the relative value of samples of Scotch, English and German origin. His results show that it is possible to select chloroform of a very high degree of purity, whilst, at the same time, it would appear that the commercial article is by no means uniform in quality.

Aloes.—Mr. E. M. Holmes has endeavored to account for the differences in character and odor that distinguish Curacao aloes from the ordinary Barbadoes variety. Both are affirmed to be the produce of *Aloe vulgaris* (Lam.), which was introduced into the West Indies about the beginning of the sixteenth century. Mr. Holmes attempted to solve this problem three years ago, when he proved that the former kind is really obtained from *Aloe chinensis* (Baker), and the conclusion he arrived at was that the aloes of Curacao was probably modified to some extent by an admixture of the juice from the leaves of *Aloe spicata* and *A. Succotrina*. This has been disputed by Señor S. C. Henriquez, a manufacturer of aloes at Curacao, who sent specimens of his preparations to the Pharmaceutical Society's Museum in March of this year, together with some interesting information concerning the process of manufacture. These notes are quoted in detail in Mr. Holmes' paper, together with descriptions of the various methods adopted. It would appear that the length of time that has elapsed since the collection of the juice is an important factor in determining the characteristics of the finished product. Experiments conducted by Mr. Holmes, with the assistance of Mr. H. D. Fuge, point to the fact that the sooner the juice is dealt with after collection the larger is the proportion of soluble matter that can be extracted from the dried aloes by boiling water. The fact is noted also that Curacao aloes may differ considerably in appearance, being either dull, like Barbadoes, or vitreous, like Cape aloes. It yet remains to be shown whether the Barbadoes variety has the same origin as Curacao aloes, and to what the difference in odor is due.

Vortmann's Test for Hydrocyanic Acid.—Mr. H. Bowden thinks that this test has not attracted sufficient attention. It consists in adding to the suspected liquid a few drops of potassium nitrite solution and three drops of ferric chloride solution. The brown precipitate produced is dissolved in dilute sulphuric acid, the mixture boiled, then cooled, and ammonia added to precipitate the iron. After removal of the precipitate, dilute freshly-prepared ammonium sulphide solution is added to the filtrate, when a violet coloration is produced which changes in turn to blue, green, and again violet. Mr. Bowden has applied the test for the acid with great success, and describes a number of his experiments in detail. When cyanides are in question he prefers to liberate the acid before testing. He considers that the extreme delicacy of the test,

conjoined with the great difficulty experienced in detecting hydrocyanic acid in bodies long after death, should induce toxicologists to give it a trial.

The adjournment for lunch at the Waterloo Hotel then took place as on the previous day, and on reassembling the following papers were read :

Quinine Phosphate.—Mr. George Coull has recently investigated the composition of quinine phosphate and finds that there are *at least* two phosphates. He suggests that, in view of the practical importance of a difference in the percentage of alkaloid, it would be advantageous that a salt having a definite formula should be specified in the B. P. C. Formulary. *Barium hypophosphite* is another compound in which Mr. Coull has found considerable variation, and he recommends that the anhydrous salt be used and the standard of purity raised. In *phosphoric acid*, too, he has found silica present, and a simple test is suggested for its detection.

Cacao Butter.—The record of Mr. T. Maltby Clague's investigation into the melting point of cacao butter affords a remarkable instance of the manner in which variation in the behavior of different samples of a similar substance may often be explained by purely physical causes. Indeed, his experiments go far to prove that this substance may have its characteristics considerably influenced and even permanently altered by a temporary subjection to changes in its surroundings. In ten commercial samples of cacao butter he found the melting point varied from 73° to 91° F. The B. P. range is from 86° to 95°. A sample expressed by Mr. Clague from the nibs with the aid of heat melted at 91°, another obtained by percolation with ether, at 83°, whilst a third extracted in the same way from a prepared cocoa had a melting point at 96°. Certain of the commercial specimens were further treated by being heated consecutively to 105°, 120°, 150° and 180° F. The melting point in each case altered considerably under this treatment, for, being ascertained after each step, it was found to rise until it reached an apparent maximum, after which any further increase of temperature lowered it again. Maintaining an increased temperature for a length of time was also found to exert a distinct influence, a sample with a melting point of 75° F. having this raised to 86°, after being kept at a temperature just under 100° for two hours. It appears evident that such variability in the commercial product is the result of the application of heat in greater or less degree during the process of extraction; for a specimen prepared by percolation with ether from its unroasted nibs possessed a practically constant melting point of 86° F. Mr. Clague inclines to the opinion that a complete solution of the difficulty will only be obtained after a chemical investigation, and meanwhile he warns dispensers to exercise care in the selection of cacao butter suitable as a basis in suppository making.

At the conclusion of this paper Mr. Clague made some remarks on the methods of taking melting points.

Tincture of Cinchona.—Messrs. E. H. Farr and R. Wright, continuing their investigations on tincture menstrua, gave particulars of their experiments with tincture of cinchona, and the results appear to indicate the advantage of the official macero-percolation process as compared with other methods in the preparation of this galenical.

Mr. F. C. J. Bird described a *novel pressure filler* of great simplicity, which he has found of value in making determinations by Mayer's method.

Mr. T. R. Carswell dealt at great length with the *action of iodine on phenol* in alkaline solutions under various conditions, and specially referred to the determination of this substance volumetrically.

Spurious Ipecacuanha.—Mr. T. H. Wardleworth's paper described *Ionidium Ipecacuanha*, and compared its structure with that of the root of genuine ipecacuanha.

Essence of Lemon.—Mr. Arthur A. Barrett described the manufacture of this essential oil as it is carried on in Sicily. He pointed out in the first place that the statement to be found in most books as to the use of the *écuelle* for this purpose is incorrect at the present time. The sponge process is now generally adopted in Sicily. In regard to the quality of the essential oil, it appears from Mr. Barrett's account that considerable differences may exist when the purity of the oil is undoubted, and that much depends on the condition of the fruit used and the time when the oil is made. Adulteration with turpentine, specially refined for that purpose, appears to be frequently practised, and to a very large extent. According to Mr. Barrett, English wholesale druggists are supposed to buy oil of low quality, the greater part of which is said to go to London, Manchester and Glasgow. The addition of turpentine is said to be secretly practised by the workmen engaged in the extraction of the oil; so that it is difficult for manufacturers to know whether the oil they make is really pure. The methods in use for testing the quality of lemon oil appear to be extremely crude, and to consist chiefly in reliance upon the sense of smell.

Concentrated Oil of Lemon.—Mr. A. A. Barrett has for some time been directing his attention to the separation of that portion of lemon oil to which the flavor is due from the terpene with which it is naturally associated. As in the case of many other essential oils, the terpene constituting the chief bulk of lemon oil is comparatively destitute of taste and odor. The characteristic taste of the essential oil of lemon belongs to a small proportion of another body which has a higher boiling point than the terpene, and also a higher specific gravity than ordinary lemon oil. Mr. Barrett does not give any information as to the chemical nature of the concentrated lemon oil, nor does he state how it is prepared, though it may be assumed that the method adopted is careful fractional distillation. The advantages of the article are said to lie mainly in its ready solubility in weak spirit and its greater suitability as a flavoring material in the manufacture of aerated beverages. Mr. Barrett points out that the specific gravity of the concentrated oil is its most important characteristic. It should not be less than .900 if the whole of the terpene has been removed.

Myrabolanes.—Mr. A. C. Stark's paper dealt with the proximate analysis of commercial myrabolanes.

Tomatoes.—Mr. Frederick Davis dealt with the qualitative analysis of the tomato (*Lycopersicon esculentum*).

After the conclusion of the papers the President presented the books given in accordance with the Bell and Hills bequest, and the two volumes given by Mr. Thomas Hanbury, Mr. Laidlaw Ewing acknowledging these gifts in an appropriate speech. The Formulary Committee was reappointed, and, as a result of the motion of which Mr. Payne gave notice last year, it was decided that in future the practice of meeting at the same place and time as the British

Association should not be adhered to. On the motion of Mr. Boulton, seconded by Mr. Gill, it was decided that the next meeting should be held at Nottingham. The senior Honorary Secretary read out the names of the newly elected officers of the Conference; the announcement that Mr. Octavius Corder, of Norwich, had been elected President, being received with hearty applause, and after the usual votes of thanks to the President and to the officers and members of the Local Committee had been passed and responded to, the business proceedings were brought to a close.

The excursion to the Forth Bridge in the afternoon of Wednesday was favored by fairly good weather, and it afforded an excellent opportunity of examining that great engineering work. The members were afterwards hospitably entertained at Inveralmond House by Mr. George Mackay.

On Wednesday morning the weather became sufficiently fine before the commencement of the second sitting to admit of the ladies' party being conveyed to the Botanical Gardens under the charge of Mr. Rutherford Hill, and afterwards in two sections to Oswald House and Willowbrae House, where they were entertained at lunch, respectively, by Mrs. Buchanan and Messrs. Brown. In the evening the ladies met in the Drawing Room of the Waterloo Hotel, where there was a musical entertainment which had been arranged under the care of Mr. Buchanan. The smoking concert was as usual an attractive feature of the meeting, and was numerously attended.

On Thursday morning, at 8.45, the members mustered in the Princes Street Station of the Caledonian railway and proceeded by special train along a route unsurpassed by any other in Scotland for the varied beauty of its scenery to Killin, in the heart of the Perthshire Highlands. Shortly after mid-day, luncheon was served in the grounds of Finlarig Castle. The weather was very fine, and all arrangements excellently carried out, with great credit to the organizers and much enjoyment to the guests, numbering upwards of two hundred and fifty.

MEETINGS OF STATE PHARMACEUTICAL ASSOCIATIONS.

The Massachusetts State Pharmaceutical Association held its eleventh annual meeting in Springfield, September 6, President H. M. Whitney in the chair. Among the subjects presented for discussion through papers or specimens were the following: Copper in the volatile oils of the aurantiaceæ; lactic acid and lactophosphate of calcium; cause of difference in color of compound extract of colocynth; Blaud's pills; poisoning by the root of *Cicuta maculata*; assay processes for sanguinaria and lobelia, etc. The cutting of prices was discussed in a paper by Mr. Canning, and the Association endorsed the plan of the Interstate Druggists' League, whose platform is to withdraw all patronage from any house knowingly furnishing cutters with medicines or proprietary articles, and to discontinue the sale of proprietary articles which are furnished to cutters by manufacturers or their agents. The officers elected for the ensuing year are: F. H. Butler, Lowell, president; M. L. H. Leavitt, Boston, Secretary, and T. B. Nichols, Salem, treasurer.

The New Hampshire Pharmaceutical Association had its nineteenth annual meeting at Keene, September 6. The address of President Currier, various

committee reports and several papers claimed the attention of the meeting. A. S. Wetherell, Exeter, was elected president; F. L. Way, Manchester, secretary, and A. D. Smith, Manchester, treasurer. The twentieth annual meeting will be held on the Isle of Shoals, September 5, 1893.

The North Dakota Pharmaceutical Association met in Fargo, August 2, and discussed mainly matters of trade interest. A. I. Widlund, Grand Forks, was chosen president; L. Christianson, Fargo, Secretary, and G. A. Day, Fargo, treasurer. It was contemplated to hold a special meeting at the World's Columbian Exposition next year.

The South Dakota Pharmaceutical Association convened at Sioux Falls, August 17, Vice-President Poppe presiding. Higher education in pharmacy was discussed by Prof. Shepherd of the State Agricultural College. R. M. Colton, Tyndall, was elected president; I. A. Keith, Lake Preston, secretary, and G. W. Lowry, Sioux Falls, treasurer. Yankton was selected for holding next year's meeting, August 16. J. M. King, local secretary.

The Pharmaceutical Association of the Province of Quebec held its twenty-second annual meeting in the Laval University, Quebec, June 14. President Gray, in his annual address, gave a brief historical sketch of the Montreal Chemists' Association, organized in 1864, reorganized in 1867, and extended in 1870, when the present Provincial Association was incorporated by the legislature. The pharmacy act of 1875 made examinations obligatory for carrying on the drug business. The printed Proceedings of 24 pages contain the address, the report of the Council, and the minutes of the meeting. The executive officers of the preceding year were re-elected, viz: Henry R. Gray, president; A. Manson, treasurer, and E. Muir, secretary, registrar and assistant treasurer; all residing in Montreal.

Printed reports of meetings of State Pharmaceutical Associations have been received as follows:

Kentucky. Fifteenth meeting. Pp. 116. See July number, p. 383.

Pennsylvania. Fifteenth meeting. Pp. 198. See July number, p. 385.

EDITORIAL.

New College Building.—In the May number, p. 281, we have given a brief account of the new building, and the alterations in the older buildings that had been contemplated for the past summer. On Monday, October 3, the lectures will begin, and we are much pleased to inform our readers that, at this writing, the lecture rooms and laboratories are practically ready for occupancy, and that both the didactic and laboratory instructions will not in the least be interfered with. As might be expected where such extensive building operations had to be completed in the course of a few months, some of the details, as for instance the arrangement of the collections, have not yet reached that state of perfection, which they had attained during an undisturbed occupancy of the quarters for eleven, and in some cases for over twenty years. But these are inconveniences which do not affect the students, whose needs and comforts have been amply provided for in every direction.

It is not our purpose to give a description of the College buildings as they appear at the present time; we shall defer this until the internal arrangements in the front building are all finished for occupancy; we may now mention that other changes, not mentioned in our May issue, were shown to be desirable, and accordingly were carried out during the summer. The most important of these changes is the location of the boiler house for the heating, ventilation, etc., of the buildings. Instead of placing the boilers under one of the three buildings as originally contemplated, it was found to be more desirable to erect a fourth building two stories high, in the northeast corner of the lot, where the annex to the chemical laboratory had been. Thus, in addition to the large boiler room, there has also been obtained a large annex to the chemical laboratory, and an annex of the same size to the pharmaceutical laboratory, nearly doubling the previous capacity of each laboratory.

The pictures of the front building, which have been published in several journals, are very fair and correct representations, taken from the architect's drawings; but in our opinion they do not do full justice to the imposing character of the building; we have, therefore, preferred to defer the presentation to our readers of a picture until it can be taken from the finished front.

We are pleased to note the fact that the work on the buildings has progressed without any accident, except a slight fire which occurred on the morning of July 15th from spontaneous combustion among some material stored in one of the laboratories. A hole was burned through the floor, but the fire was readily extinguished by means of a portable chemical fire engine, and the damage done was slight.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Jahresbericht, 1891. Vereinigte Fabriken chemisch-pharmaceutischer Producte. Feuerbach-Stuttgart and Frankfurt a. M. 1892. 8vo. Pp. 96.

An interesting annual report, giving not only the commercial conditions of a large number of medicinal chemicals, mostly of organic origin, but likewise brief surveys of their therapeutic applications.

Mitteilungen aus dem pharmaceutischen Institut und Laboratorium für angewandte Chemie der Universität Erlangen, von A. Hilger.

Communications from the pharmaceutical Institute and Laboratory for applied chemistry of the University of Erlangen.

These reprints from the Archiv der Pharmacie comprise essays on the chemical composition of ancient Egyptian eye-paints, by H. Fischer; on the constituents of *Menyanthes trifoliata* and *Erythraea Centaurium*, by K. Lendrich; on absinthiin, by Oscar Senger, and on the fruit of *Capsicum annum*, by Theo. Pabst.

A Manual of Chemistry, inorganic and organic; with an introduction to the study of chemistry. By Arthur P. Luff, M.D., B.Sc. (Lond.), etc. Illustrated with 36 engravings. Philadelphia: Lea Brothers & Co., 1892. 12mo. Pp. xvi and 525. Price, cloth, \$2.

The book is intended for students of medicine and the author being connected with medical schools in London as demonstrator of chemistry, lecturer on medical jurisprudence and toxicological chemistry, and examiner in

forensic medicine, is obviously familiar with the wants of medical students. The book is divided into four parts, viz: introduction, comprising chemical physics and theoretical chemistry; non-metallic elements; metallic elements, and organic chemistry; and an appendix has been added as Part V, containing instructions in the calculation of chemical problems, and an outline of qualitative analysis. As may be judged from the size of the volume, it can give only the mere outlines of chemistry; but these, as a rule, are well presented. The rare elements are omitted, they being of no medicinal importance, but cadmium, we think, should have deserved recognition, since a few compounds have been, and to some extent are still, employed as remedies. In a few cases vague or partly incorrect statements have been observed; thus, p. 412, it is said that all the chloroform of commerce is prepared by the decomposition of chloral; on p. 465, the purgative principle of jalap is called jalapin, while chemists have named it convolvulin, and to avoid the existing confusion, the name jalapurgin has been more recently recommended for it; on p. 469, chrysophanic acid is asserted to be also known as pure chrysarobin and to be a constituent of araroba and rhubarb root. We regard the book as well adapted for aiding the medical student in the acquisition of a sound knowledge of the fundamental principles of chemistry, and consider the introductory chapters more especially as presenting the theories of composition and combination in a satisfactory manner for this purpose.

Education of Business Men.—Published by American Bankers' Association. New York. 1892.

Two pamphlets, covering together 55 closely printed pages and containing an address by Prof. E. J. James, of the University of Pennsylvania, together with various reports, letters, etc., refer to the founding of schools of finance and economy.

The Twentieth Annual Report of the Zoölogical Society of Philadelphia. 1892. Pp. 21.

An appendix to the report contains lists of animals bred in the zoölogical garden during the past year, and of acquisitions by purchase, exchange and presentation. The total number of animals composing the collection, February 29 last, was 1,001, valued at \$47,567. The Society was incorporated March 21, 1859.

The Wills Eye Hospital. Report for the year ended December 31, 1891. 8vo. Pp. 25.

The total number of patients treated at the clinics during 1891 was 12,280, and the number of operations performed 2,763. The Hospital was founded April 2, 1832.

The Principles of Theoretical Chemistry, with special reference to the constitution of chemical compounds. By Ira Remsen, Professor of Chemistry in the Johns Hopkins University. Fourth edition, thoroughly revised. Philadelphia: Lea Brothers & Co. 12mo. Pp. 322. Price, cloth, \$2.00.

We are much pleased to note the appearance of a new edition of this work which, upon its first appearance, supplied a want that had been seriously felt, and which, we believe, has exerted a very gratifying influence in promoting the study of chemical philosophy. The intrinsic value of the work has also been

recognized abroad, and translations of it into the German and Italian languages have been well received in Europe. The author states that his object has been and is, to help students to get clear ideas in regard to the foundations of chemistry. Any one who examines the book will acknowledge that the author has thoroughly accomplished his object, for it would be difficult to find a treatise on theoretical chemistry giving in so compact a form a more lucid and comprehensive account of the theories of the science based upon more than a century's elaborate researches into the governing laws of the combination, composition and decomposition of matter. In the present edition the text has been thoroughly revised, and it was deemed desirable to add a new chapter on solutions—a subject which for a long time has claimed the attention of scientists, but of recent years has assumed considerable importance in relation to the molecular weights of chemical compounds.

An Illustrated Encyclopædic Medical Dictionary, being a dictionary of the technical terms used by writers on medicine and the collateral sciences, in the Latin, English, French and German languages. By Frank P. Foster, M.D., editor of the New York Medical Journal, etc. Vol. III. New York: D. Appleton & Co. 1892. 4to. Pp. 1545 to 2320.

In the preceding volume (1891, p. 109) we have entered somewhat minutely into the scope and character of this grand work. The volume now issued opens with the word *fascia*, which, with its affixes and prefixes, occupies nearly six columns. The comprehensiveness of the work is well illustrated by the references to fever, also noted under *febris*, *Fieber* and *fièvre*, occupying, respectively, 14, 8, 1 and 1½ columns. The word *grass* has required nearly six columns, and the corresponding Latin, French and German terms (*Gras* and *gramen*) over one column. The French term *herbe* needed four and one-half columns, the English *herb* about one-half a column, and the Latin *herba* and the German *Kraut* about one and a half columns each. These examples will show the great care bestowed upon the contents of the work as far as the number of references is concerned; and on close scrutiny it will also be found that no labor has been spared by the editor and his collaborators to make the information correct and reliable. The text extends to the word "Minjaklagam." As we stated before, the typographical arrangement leaves nothing to desire; but particular commendation is due to the close attention paid to the proof-reading, and, in consequence thereof, to the freedom of the text from typographical errors.

Pharmaceutical and Chemical Problems and Exercises in metrology, percentage and proportion, fortification, dilution, specific weight, thermometry, chemical formulas and equations, including nine hundred chemical reactions, together with rules and explanations, also sufficient rules governing the latinity of pharmaceutical nomenclature and prescription writing; with aids to proper accentuation in pronouncing the latinic titles. Intended as an aid to teachers, students and examiners. By Oscar Oldberg, Ph.D., Professor of Pharmacy, Northwestern University. Second edition, revised and greatly enlarged. Published by the Apothecaries Company, Chicago. 1890. 12mo. Pp. 176.

The title of this work is so comprehensive as to give a full and correct idea of the contents of the book. Compared with the first edition it has not only been enlarged, but practically re-written. The rules and explanations given

are clear and satisfactory, and the examples and exercises given are so numerous—2,235—as to cover a very wide field of pharmaceutical knowledge and practice. Though the solutions of the problems are not given in the book, for obvious reasons, the intelligent student can easily and advantageously use it for home study.

Materia Medica and Therapeutics.—A manual for students and practitioners. By L. F. Warner, M.D., attending physician St. Bartholomew's Dispensary, New York. Philadelphia: Lea Brothers & Co. Pp. 223. Price, cloth, \$1.

This is volume 5 of "The Student's Quiz Series," edited by Dr. Bern B. Galaudet, of New York, and intended for the use of medical students. Like in other works of similar character, the subject matter is arranged in the form of questions and answers. Necessarily, the facts are given in the briefest possible manner, consistent with clearness and comprehensiveness. The classification adopted is based on the same principles as met with in larger medical works on materia medica, the remedies being grouped according to their chief medical properties. The author has taken notice not only of the pharmacopœial drugs and preparations, but likewise of the more important compounds introduced as medicinal agents during recent years. The little book may be made to do good service as a convenient remembrancer.

Ueber Sulphonsäuren einiger China alkaloiden.—Zur Kenntniss der Coca-blätter.

Two valuable papers by Dr. O. Hesse, treating of the sulphonic acids of several cinchona alkaloids, and of the constituents observed by the author in several varieties of coca leaves procured from different localities in South America, India and the East Indian Islands. The pamphlets are reprints from Liebigs Annalen, vols. 267 and 271.

Les Teintures alcooliques de la Pharmacopée française. Étude chimique et analytique; comparaison avec les pharmacopées étrangères. Par Albert Domergul. Marseille. 1892. 4to. Pp. 209.

The alcoholic tinctures of the French pharmacopœia.

A thesis presented to the Paris School of Pharmacy for obtaining the superior diploma of "Pharmacien de 1^{re} classe." This elaborate essay on the eighty alcoholic tinctures of the French Codex comprises researches on the history of each formula, the physical and chemical characters of each product, including the extracts and ash obtainable, and the deposits formed on standing; and finally a comparison with the corresponding preparations of other pharmacopœias.

Foods and Food Adulterants.—Investigations made under the direction of H. W. Wiley, Chief Chemist. Part seventh. Tea, coffee and cocoa preparations, by Guilford L. Spencer, Assistant Chemist, with the collaboration of Mr. Erwin E. Ewell. Published by authority of the Secretary of Agriculture. Washington: Government Printing Office. 1892.

The first part of Bulletin No. 13 of the Division of Chemistry, U. S. Department of Agriculture, was published in 1887, each part treating of a different group of articles of food and of the adulterations to which they are liable as met with in commerce. The part now before us treats of tea, coffee and cacao, and of chocolates in their various forms constituting those preparations of the last-named seed, which are the most important to the consumer. Very

valuable additions are the lists of publications, books as well as papers published in various journals and printed reports, treating of the subjects under consideration; and nine plates of heliographic reproductions of leaves and of microscopical views suitably magnified.

Experiments with Sugar Beets in 1891, by Harvey W. Wiley, chemist, etc., with the collaboration of Dr. Walter Maxwell, Prof. W. A. Henry and others. Published by authority of the Secretary of Agriculture. Washington: Government Printing Office. 1892. Pp. 158.

Bulletin No. 33 of the Division of Chemistry, Department of Agriculture, is in continuation of previous bulletins recording the experiments made in different parts of the United States with sugar-producing crops.

Proceedings of the ninth annual Convention of the National Confectioners' Association of the United States. Official record of reports, circulars and communications for the year 1891-1892. Philadelphia: Confectioners' Journal Print. 1892. Pp. 170.

The meeting was held in Washington, D.C., commencing June 1.

A new Series of Reactions for Alkaloids. By Alfred Dohme, Ph.D. 12mo. Pp. 34.

Reprint from *Pharmaceutical Review*.

W. R. Warner's Therapeutic Handy Reference Book for Physicians. Fourth edition. Philadelphia. 1892. 12mo. Pp. 119.

The contents of this work were described on its first appearance in this Journal in 1889.

Medical Education and Legislation. By Geo. J. Engelmann, M.D., St. Louis.

An extract from the author's valedictory address to the graduating class of the Missouri Medical College, and reprinted from the *Medical Fortnightly*.

Appendix to the Catalogue of the Flora of Nebraska. By H. J. Webber. Pp. 47.

The "Catalogue" was published in the report of the Nebraska State Board of Agriculture for 1889. The present pamphlet, No. 9 from the "Contributions from the Shaw School of Botany," contains remarks on many species previously reported, and adds 432 others not previously known as growing in Nebraska.

VARIETIES.

Atropine as a Hæmostatic.—In two cases of profuse metrorrhagia A. N. Dimitrieff has obtained good results by the subcutaneous injection of *atropine* in doses of 0.0003 gram. In the first case the hemorrhage stopped after four injections; in the second after three. *Atropine* is sometimes of service when other hæmostatics have failed.—*Quarterly Therap. Rev.*, July, 1892.

Potassium dichromate has been used by Dr. J. H. Hunt (*Brookl. Med. Jour.*, August), as an expectorant with favorable results; the dose for a child one year old being $\frac{1}{30}$ grain, repeated in an hour, or if necessary at shorter intervals. To dispense it for this purpose it is best kept in the form of a trituration of one part of the salt with nine parts of milk sugar. A solution of this triturate rarely acts as an emetic.

THE AMERICAN JOURNAL OF PHARMACY.

NOVEMBER, 1892.

POLYGALA ALBA, NUTTALL.

BY L. E. SAYRE, University of Kansas.

Some months ago through this journal I communicated a paper on Senega root. During subsequent months I noticed quite an extended discussion upon the subject of the market supply of this drug. I believe it is the opinion of many that a species of *Polygala*, yielding a very much smaller percentage of the acrid principle of the drug—*P. alba*—does not enter the market, and that this species is not found to any extent in the United States.

At a recent meeting of the Kansas Academy of Science, where there were present several prominent botanists and botanical collectors of the state, I took occasion to inquire whether the *Polygala alba* was found growing to any extent in Kansas. The reply was decidedly in the affirmative. Prof. A. S. Hitchcock, successor to Prof. W. A. Kellerman, having the chair of botany at the Agricultural College, Manhattan, said it was quite common in the western part of the state. Mr. Bernard B. Smyth, Topeka, who has recently issued a *Check List of the Plants of Kansas*, said it was very abundant in Ellis, McPherson and Phillips counties. Prof. W. A. Harshberger, of Washburn College, said it was found more or less abundant west of about the Sixth tier of counties in the state. In the recent check list of Kansas plants, by B. B. Smyth, I find the following species enumerated: *P. alba*, Nutt.; *P. incarnata*, L.; *P. polygama*, Walt.; *P. sanguinea*, L.; *P. Senega*, L., and *P. verticillata*, L.

The Senega root, of which I wrote in my last communication, I have been unable to grow as I had hoped to do. But since Prof.

Maisch has so fully identified and classified it, the growing of the plant seems unnecessary for purposes of identification.

Note by the Editor.—One of the roots, apparently in good condition, which had been kindly furnished by Prof. Sayre, was planted, but likewise failed to grow.

THE EPIPHYTIC CHARACTER OF THE VANILLA PLANT.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Oct. 18.

TO THE EDITOR OF THE AMERICAN JOURNAL OF PHARMACY:

DEAR SIR.—In the July issue of the "American Journal of Pharmacy" and afterward in "The American Druggist" there appeared an article by Mr. Geo. M. Beringer, Ph.G., entitled "Some Commercial Vanillas." In this article Mr. Beringer quotes from a circular letter issued by us in 1890 wherein we describe the vanilla plant as a parasite. He remarks this error is being repeated, and, singularly, by such an authority as the "Encyclopedia Britannica," and says, "while epiphyte in its character, clinging to forest trees for support, it is not parasitic, obtaining its support principally through its aërial roots, which drop to the ground, and in many of the cultivations of the islands of the Indian Ocean the plants are supported for a considerable length upon rude trellises."

We beg to differ with Mr. Beringer on this subject, and feel sure that he is in error and not the "Encyclopedia Britannica" or ourselves. When Mr. Beringer's article first appeared we received letters calling our attention to the discrepancy in our circular and Mr. Beringer's article, asking for fuller particulars in regard to the point at issue. Hesitating to reply at once, lest our former information and knowledge in regard to the plant might be at fault, we have gone to some trouble to prove the accuracy of our statement that the vanilla plant is a parasite, and to this point we have, therefore, correspondence from our friends in Mexico, Messrs. Montessoro and Scagno, of Getierres-Zamora, and Mr. L. S. Silvera, of Papantla, to verify our statement that the plant is a parasite. They state that they have often cut the vanilla plant five or six feet above the root, and that it lives from the sap of the tree after the root is cut for two or three years, but by that time its rootlets grow down to the ground again, the plant bearing flowers and fruit all the time. On the other hand, when the tree upon which the plant attaches

itself dies, the plant fails to propagate, and it will soon show decay. All attempts to grow the vanilla bean plant successfully in this country have been failures; while we have known a number of them to live for some time, none of them have ever been known to bear fruit.

My remarks refer particularly to the Mexican plant—*Vanilla planifolia*. Mr. Beringer's reference to the plants in the islands of the Indian Ocean might possibly be the case of some of the plants of the bastard species, but surely not of the plants growing the vanilla pod used as a condiment. While we admit that our knowledge of the vanilla from the islands of the Indian Ocean is not as full and as ripe as that of the Mexican, yet all information received on the subject warrants us in stating that the cultivated and wild plant bearing fruit in these countries take their sustenance and life from the sap of the forest trees.

We write this, believing that we are correct in saying that the vanilla plant—*Vanilla planifolia*—is a parasite, and substantiates the circular of 1890.

Yours very truly,

THE CHARLES E. HIRES COMPANY.

Philadelphia, October 5, 1892.

Note by the Editor.—On consulting the "Encyclopedia Britannica," 9th edit., xxiv, p. 66, we find that the vanilla plant is stated to have "a long fleshy stem and attaches itself by its aërial rootlets to trees, and appears to be little dependent on the soil for its nourishment." This description applies to an epiphytic plant, but *not to a parasite*. This is further shown from the account of the cultivation, according to which "in Mexico a clearing is made in the forest, where a few young trees, 12 or 15 feet apart, are left to serve as a *support for the climbing stems* of the vanilla plant." And further: "In Réunion, Mauritius and the Seychelles the young plants are *supported by a rude trellis* made between the trunks of the trees."

The account given in the correspondence quoted in the above letter likewise shows that the plant is epiphytic, and when cut above the ground derives its nourishment from the atmosphere, but not from the sap of the tree as erroneously stated. It is true that as late as the early part of the present century the vanilla plant was

commonly regarded, even by botanists, as being parasitic. But Mirbel showed that many plants, hitherto considered parasites, did not live upon the sap of other plants, but needed such plants merely for support, and such apparent parasites were called epiphytes. As early as 1830 Nees von Esenbeck and Ebermaier (*Handbuch*, I, p. 266) stated that the stem of the vanilla plant climbs upon high trees, fastening itself *upon the bark by means of ærial roots*. Substantially the same statement is made by Flückiger and Hanbury in *Pharmacographia*, page 657; also by Baillon (*Traité de botanique médicale*, page 1438), who carefully distinguishes the "racines adventives" of epiphytes from the "sucours" (haustoria) of parasites.

While in the cases cited the term "epiphyte" is not used, the description does not leave any doubt whatever as to the true character of the plant. In addition to these we quote from the works of several other botanists, who, like the above, have studied the plant under cultivation.

Bentley and Trimen, for whose "*Medicinal Plants*" plate 272 was drawn from a specimen in the Royal Gardens at Kew, where the plant flowers in May, state that "this singular plant is found in the hot, moist woods of several states of southeast Mexico, *climbing and epiphytic on forest trees*."

Professor A. Tschirch recently devoted a year or two in different parts of the East Indies to the study of most of the important medicinal and economic plants of that region, and has published the results of his observations in a most interesting and instructive work, entitled "*Indische Heil- und Nutzpflanzen und deren Cultur*" (Berlin, 1892). The book contains photographic reproductions from Java and Ceylon of a vanilla plantation, and of single plants, showing their habit, of *Vanilla planifolia* under cultivation and run wild. In describing the culture of "this unpretentious epiphytic plant, for which neither elegance of growth nor of the flower can be claimed," Prof. Tschirch explains that "since the vanilla is a *climbing epiphyte*, *its caulomes need a support*. The nature of this support is entirely immaterial, for the vanilla plant, like ivy, does not produce haustoria penetrating into the supporting plant, but merely fastening organs (Haftorgane). . . . Since the vanilla plant does not enter into an organic union with its support, it *cannot take any nutriment from the bark of the latter*" (loc. cit., p. 122).*

If further proof be desired, it will be found in the anatomical structure of these aërial roots as compared with the haustoria of parasitic plants. The covering (velamen radicum) of the aërial roots of epiphytic orchideæ, and of some aroideæ, more particularly of those inhabiting tropical forests, is very neatly described by Tschirch (*Angewandte Pflanzenanatomic*, I, p. 310); the velamen of the aërial roots of *Vanilla planifolia* consists of a single layer of tissue.

GYMNOCLADUS CANADENSIS.

BY JAMES H. MARTIN, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.
No. 116.

This tree is known in Canada and the Northern States as *chicot* or *stump tree*, and in Pennsylvania and southward as the *Kentucky coffee bean* and *Kentucky magnolia*. It grows in the north to Canada, south to Kentucky and west to Nebraska. In the Southern States it is most abundant and is usually found along the banks of lakes and streams. It reaches the height of 50 to 60 feet in the north, while in the south it is oftener found from 70 to 100 feet in height.

The bark of the trunk is thick and scaly, and the outer portion is readily removed. The wood, on account of its dense character, has been used considerably in the manufacture of furniture. It is of a rose color and admits of a high polish. The leaves when green are steeped in water and used as a fly poison. The roasted beans have been used as a substitute for coffee. In the immature state they appear to have some toxic properties, but become changed by the process of ripening and by roasting. The ripe beans are often roasted and eaten by children with impunity. There are one or two cases recorded where the immature green fruit has been eaten raw, and in each case producing nausea and vomiting. The pods when preserved like those of tamarind are said to be wholesome and slightly aperient. The physiological action of the beans has been described by Dr. Owens, as follows: "The immature bean collected in early autumn has been found to be a typical respiratory poison. It depresses reflex excitability by acting on the spinal centre. It paralyzes the centre of respiration by increasing pause after expiration. It lowers the blood pressure and decreases the pulse; and increases to a slight degree the nerve sensibility."

Various parts of the tree were submitted to proximate analysis. *The pulp* surrounding the beans was first examined, and found to contain 17.5 per cent. of moisture and 5.5 per cent. of ash. The greenish color disappeared with the wax removed by petroleum ether, with the resin removed by stronger ether, and with the sugar removed by alcohol.

The first two solvents removed nothing worthy of note, but the absolute alcohol extracted glucose, and a substance giving all the reactions of a glucoside. Water extracted 4.8 per cent. of mucilage, 7.4 per cent. of dextrin and organic acids, which were proven to be tartaric and citric, the former predominating.

The inner part of *the bean* was found to have a slight acrid taste, and to contain 10.00 per cent. of greenish-yellow fixed oil, having a specific gravity of 0.913, and easily saponified by the fixed alkalies. It was slightly soluble in absolute alcohol, and readily soluble in petroleum ether and ether. The presence of saponin was strongly indicated in the alcoholic extract.

The testa was found to contain 5.00 per cent. of fat and 1.7 per cent. of green wax, the latter having an acrid and nauseating taste. Gallic and tannic acids were shown to be absent.

The pod yielded to petroleum ether 3.8 per cent. of a greenish-yellow fat, to stronger ether 1.7 per cent. of a greenish substance soluble in acidulated water, and to absolute alcohol a brownish substance soluble in water.

The bark of the tree was exhausted with petroleum ether, which dissolved about 10.00 per cent. of a greenish fixed oil, having a specific gravity of 0.933, and easily saponified by the fixed alkalies, but sparingly by ammonia. It was found to be almost insoluble in absolute alcohol, but soluble in ether, chloroform, benzol and glacial acetic acid. No indications of alkaloid were obtained in any of the parts examined. Saponin appears to be the principle to which the physiological activity of the plant is due, and was found in all parts.

NOTE.—The seeds were examined by Samuel S. Mell, in 1887.¹ He found 10.00 per cent. of fixed oil, having a specific gravity of 0.919. He also found a little tannin and a glucoside. The tannin was not detected by Mr. Martin, although he noticed a principle

¹ American Journal of Pharmacy, 1887, page 230. °

which caused a darkening with ferric chloride, without responding to any other of the tannin tests. The glucoside noticed by Mr. Mell was probably saponin, since it was extracted from aqueous solution by chloroform.

H. T.

THE VALUE OF EHRLICH'S URINE TEST FOR TYPHOID FEVER.

By GEORGE M. BERINGER.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Oct. 18.

The color produced by urine with a solution of sulphanilic acid has been claimed by Ehrlich as a means of detecting typhoid in its earlier stages, even before the appearance of the typical symptoms, *rash, etc.* Mr. Joseph W. England reported the following method of applying the test (American Journal of Pharmacy, 1891, page 611). A small quantity of a one per cent. solution of sodium nitrite is added to the urine and then a quantity of a saturated solution of sulphanilic acid in a five per cent. solution of hydrochloric acid, followed by the addition of ammonia. The test is stated to produce a urine color.

Dr. C. E. Simon, of the Johns Hopkins hospital, recommends the contact method and the following modification of the test: "Solution 1, a saturated solution of sulphanilic acid in 5 per cent. hydrochloric acid; solution 2, a 5 per cent. solution of sodium nitrite; 40 cc. of solution 1 is mixed with 1 cc. of solution 2, and an equal amount of urine is added and mixed. 1 cc. of ammonia is now carefully run down the side of the test tube; at the junction of the two liquids there will be observed a ring of the characteristic color varying from an eosine rose to a deep garnet red." This method of applying the test was followed by the writer in the experiments here recorded. Neither of these writers appear to question the reliability of the test.

The color produced in applying this test is undoubtedly due to changes in the composition of the amido benzene-sulphonic acid (sulphanilic acid), which is changed by nitrites or nitrous acid in the presence of alkalis to diazo-benzene-sulphonic acid, and this reacting with the peculiar principle present in the urine produces the color most likely due to an amine derivative. The reaction is analogous with that used in the estimation of nitrites in water.

The peculiar principle in typhoid urine producing the reaction still remains to be studied. Experiments showed that it could be extracted by ether from the urine strongly acidified with hydrochloric acid. The aqueous solution of the residue from the ether solution gave the characteristic reaction. But the urine rendered alkaline with sodium hydrate would not yield to ether any principle giving this reaction.

Having occasion to apply this test, I obtained typical reactions not only with known typhoid urine, but also in remittent fever and frequently where there were no febrile conditions at all.

This suggested a series of experiments to decide to what extent chemical products were likely to interfere in this reaction, especially those which from internal or external administration were apt to appear in the urine or were known to be normal or abnormal constituents.

In the experiments, one per cent. aqueous solutions of the chemicals were used where the solubility would permit, otherwise saturated solutions.

Neutral liquids, such as alcohol, methyl alcohol, acetone, aldehyde, paraldehyde, ether, chloroform and turpentine were found to have no effect. The mineral acids and their salts, and organic acids such as lactic, oxalic, acetic, tartaric and citric acid and salts, also gave no reaction.

Salicylates and benzoates gave an orange-colored reaction, the line having a distinct green tint.

The following alkaloids and neutral principles gave also no reaction: quinine, strychnine, cinchonine, cinchonidine, morphine, codeine, cocaine, atropine, caffeine, salicin, piperine, propylamine and phenacetine.

Upon adding a few drops of a 1 per cent. antipyrine solution to the mixed reagents, there is produced at once the well-known green coloration produced by this product with nitrites. The supernatant ammonia assumes a yellow color, separated sharply from the green solution by a brilliant red line.

Urea, uric acid, glucose and saccharose were all found to have no effect. Albumen gave an orange to a red line, depending on the amount present; 2 drops of a one per cent. solution gave a reddish orange reaction, and upon increasing the amount of albumen, it became a distinct red. While pepsin gave but a green line, the

addition of a very small quantity of peptone resulted in producing a distinctly pale red line.

The most minute quantities of phenol and creasote gave a dark red at once, and a single drop of a one per cent. phenol solution gave a reaction identical with that obtained from typhoid urine. Sulphocarbolates of sodium and zinc gave a pale eosine red line, gradually darkening.

Beta-naphthol gave a brilliant magenta color and resorcin a dark red brown at once. Thymol and eugenol likewise produced the red line. Gallic acid and pyrogallol produce a dark red, the entire layer of ammonia quickly assuming the same color. With tannic acid the reaction is peculiar. The mixed test solutions assuming an orange coloration and the ammonia becoming red, a green-colored line sharply marking the separation.

From the above, I am compelled to question the claims that have been put forth for the value of this test.

While the absence of the reaction may indicate the absence of typhoid, the presence of the reaction would not warrant the diagnosis of typhoid unless supported by other evidence, as many of the products producing the reaction, notably phenol and peptone, may be present in the urine from other causes.

EXTRACT OF BEEF AND PEPSIN.

BY JAMES T. SHINN.

Passing through Chicago last summer an opportunity was afforded for visiting the great packing establishment of Armour & Co., which is located among the famous stock yards of this metropolis of the West.

These stock yards by the way are worthy of a moment's notice. You take a train in the middle of the city and in half an hour arrive at the arched gateway inscribed: "Union Stock Yard, Chartered, 1865." Inside there are 400 acres of ground laid out with 20 miles of streets and water troughs, 200 acres of yards, 75 miles of drain and water pipes, and 50 miles of feeding troughs. There is capacity for the daily caring of 160,000 animals, cattle, sheep and hogs, and it is interesting to see the long rows of horses, with cowboy saddles on, tied along the sides of the streets ready to carry buyers and sellers to the different pens. About \$5,000,000 are invested in the plant, and it requires 1,000 employes to handle the animals,

which in 1890 numbered nearly 14,000,000, including horses and calves. It is one of the curious sights of the place to see the cattle lured from the yards to the slaughtering pen by a white decoy steer, "Old Billy," who calmly walks ahead of the drove and deftly turns aside at the entrance gate, while the rest rush in to their fate. It takes less than ten minutes to convert the live steer into a carcass of beef ready for the cooling room, and nothing from the tip of his horns to the last hair of his tail, inside or out, is allowed to be wasted.

Armour's works occupy about 54 acres within the enclosure, where the slaughtering, curing, manufacturing and packing of the various products are carried on to an extent of seventy millions of dollars per annum.

The making of extract of beef and pepsin has been added to the other industries and is of special interest to pharmacists. Under the guidance of Mr. Manwaring and Mr. Walton we were shown through this department and saw such of the processes as were in operation.

For the *extract of beef* prime lean, well trimmed meat is finely cut up and digested with steam heat in huge wooden vats; the juice is expressed, filtered through muslin, and sucked into vacuum pans, each capable of reducing seventy-five cubic feet to the proper consistence in thirty-five minutes. The facilities for obtaining the best and freshest meat from the finest cattle are obvious, and the use of improved machinery insures the absence of all unpleasant burnt taste.

In the preparation of the various *pepsins*, they have the great advantage of an unlimited supply of *perfectly fresh* hogs' stomachs and can use from 10,000 to 14,000 daily. About two ounces are cut out of the whole stomach, the rest being rejected as inferior, the mucous membrane is scraped off and digested for six or eight hours in a dilute solution of muriatic acid, and by some peculiar process the *peptones* are eliminated, the solution clarified by settling at a very low temperature, and finally dried on glass plates. Saccharated pepsin is also made by Scheffer's process, and pepsins of various digestive power are put up for market.

With an experienced and capable chemist, who has unlimited material and capital to back him, there should be no reason why we should not be supplied with the very best products from an American laboratory.

MISTURA GLYCYRRHIZÆ COMPOSITA.

BY WALTER L. STEPHEN.

The following method of making *mistura glycyrrhizæ comp.* yields a preparation affording no sediment whatever, as proven by my experiments :

R. Acaciæ pulv., $\frac{3}{4}$ ss.
 Ext. glycyrrhizæ pulv., $\frac{3}{4}$ ss.
 Sacchari pulv., $\frac{3}{4}$ ss.
 Spts. æth. nit., f $\frac{3}{4}$ ss.
 Vin. antimonii, f $\frac{3}{4}$ i
 Tr. opii camph., f $\frac{3}{4}$ ii
 Aquæ dest., f $\frac{3}{4}$ xii

Having mixed well the powders, add 6 fluid ounces of water gradually and rub to a paste. Place this in an evaporating dish and heat until perfectly fluid. Add the sweet spirit of nitre, wine of antimony and paregoric and enough water to make the required amount. The heat employed destroys molecular aggregation otherwise not effected and results in better and perfect diffusion of the solid substances, which gives a product devoid of sediment.

Philadelphia, October 26, 1892.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

Syrupus Granati corticis.—100 gm. of the finely powdered bark are boiled for one hour with dilute alcohol, sp. gr. 0.892, using a reflux condenser ; after cooling, the drug is exhausted with dilute alcohol, and the percolate, after the addition of 60 gm. sugar, is evaporated on a water-bath to 100 gm. Alkaloidal assays of this preparation freshly made and after the expiration of two years gave almost identical results. The precipitate produced upon standing contained no alkaloid, but appeared to consist almost entirely of tannin. Owing to the deterioration of the dried bark and the stability of the syrup, it is suggested that the syrup be made in such places as abound in the production of the drug. The presence of 23 per cent. tannin in the bark imparts to the syrup an unpleasant, astringent taste ; endeavors to manufacture a more palatable preparation led to the following formula : The powdered bark is digested with the necessary quantity of water for twelve hours in a water-bath ; after cooling, 50 per cent. slaked lime is incorporated, allowed to

stand again for twelve hours, mixed with 4 or 5 volumes of alcohol, sp. gr. 0.830, strained and expressed. The percolate is slightly acidified with dilute sulphuric acid, filtered and distilled; there remains an almost pure solution of the alkaloidal sulphates, in which the alkaloids are determined, and the preparation is finished by adding sugar and a small quantity of the syrup according to the first formula, through which sufficient tannin is introduced to form the more reliable tannate of the alkaloids. Of a syrup containing one per cent. of the alkaloidal sulphates, thirty grams constitutes a dose, best administered in an emulsion of thirty gm. castor oil. The alkaloids are determined as follows: The solution of the sulphates, freed from alcohol, is mixed with a slight excess of milk of lime; after an hour 300 cc. petroleum ether (boiling point 45° C.) are thoroughly agitated with the mixture, allowed to stand and the petroleum ether removed as completely as possible, mixed with 50 cc. $\frac{n}{10}$ sulphuric acid, the solvent recovered by distillation, used again in the extraction of alkaloid, etc., until the alkaloids have been completely extracted; after the removal of the solvent the excess of acid is titrated with $\frac{n}{10}$ potassium hydrate. Each cc. of the $\frac{n}{10}$ sulphuric acid neutralized by the alkaloids corresponds to 0.02 gm. alkaloidal sulphate. The alkaloids in the syrup can only be estimated after precipitating the sugar with an excess of alcohol.—E. Aweng, *Journ. d. Pharm. Els-Lothr.*, 1892, 209.

Test for oil of sesame.—Baudouin's test with sugar and hydrochloric acid is best carried out by using the following proportions: 0.1–0.2 gm. sugar are dissolved in 20 cc. hydrochloric acid (specific gravity 1.18), 10 cc. of the oil added and the mixture well shaken; no matter whence the source of the sesame oil the acid layer immediately upon separation shows a permanent deep wine-red coloration. In the test it is essential that the hydrochloric acid be of the prescribed strength, as a weaker acid will not give the test. Olive, cotton-seed and arachis oils cause no red coloration, but impart to the acid after a time a dirty yellowish-brown color; mixtures of sesame and olive impart a red color, the intensity of which is proportionate to the quantity of the former oil; 10 per cent. sesame oil still causes a pure dark-rose color. Of the several commercial olive oils only the Bari-oil, as announced by Villavecchia and Fabris, by the above test simulates the behavior of sesame oil, but there are such points of difference that it is possible to distinguish

between the two. Bari-oil with the test gives a red coloration equal in intensity to olive oil containing 10 per cent. sesame oil, but this coloration never appears immediately after the separation, but always requires several minutes for its development; again, the color always shows a bluish-violet shade. Of interest is also an observation made with an old, strongly rancid sesame oil, this gave an indigo blue instead of a wine-red coloration.—Dr. G. Ambühl. *Schwz. Wochenschr. f. Chem. u. Pharm.*, 1892, 381.

Syrup of Glycyrrhiza made from the root must vary in quality as the root contains more or less of glycyrrhizin. Dr. O. Linde proposes to first isolate the acid ammonium glycyrrhizin and use this in the preparation of the syrup. The cut root is extracted with cold water, the liquid boiled, filtered, concentrated, precipitated with an excess of dilute sulphuric acid, the precipitate washed, dissolved in the least possible quantity of ammonia water and the solution evaporated upon plates at a moderate temperature. Prepared by this method the ammoniated glycyrrhizin will conform to the following tests: (1) Heated with solution of potassium hydrate it evolves ammonia. (2) 0.1 gm. must be completely soluble in 10 gm. cold water, forming a clear, pale-brown solution having a faint acid reaction. (3) This solution with 3 gm. dilute acetic acid yields a precipitate, coagulating by stirring, and an almost colorless filtrate which should be free from mineral acids. (4) 1 gm. dissolved in 2 cc. water of ammonia and 4 cc. alcohol with 15 cc. absolute alcohol forms a very turbid mixture. (5) 0.1 gm. must dissolve in 3 gm. glacial acetic acid with pale-brown color, the addition of 20 cc. water causes a coagulable precipitate, whilst the filtrate is almost colorless.

If the above extraction be made with a dilute ammonia water a better yield, although of inferior quality, can be obtained, the ammonia extracting bitter and resinous principles which afterwards are removed with great difficulty.

To make the syrup 4 parts ammoniated glycyrrhizin are dissolved in a mixture of 4 parts alcohol and 26 parts water and added to 166 parts simple syrup.—*Pharm. Centralhalle*, 1892, 531.

Stability of Volumetric Solutions.—*Potassium permanganate solution.* A solution (1 : 1,000) exposed to diffused daylight was found to have suffered no decomposition in the course of a year; at the end of eighteen months' exposure a loss of 2.61 per cent. was

observed. The solution kept in black bottles lost in eighteen months only 0.94 per cent. The solution (3:1,000) was found to possess still greater stability; kept in black bottles or exposed in colorless bottles to diffused daylight no change in the strength could be detected after eighteen months.

Sodium thiosulphate solution.—The $\frac{1}{10}$ normal solution at the end of six months was found unchanged when kept in black bottles or exposed to diffused daylight; it seems, however, that the former is the more permanent method of keeping, since in the solution in colorless glass a mould growth developed at the end of four months.

Oxalic acid solution.—The $\frac{1}{10}$ normal solution protected from light and dust was not altered in the course of five months; at the end of a year a loss of 2.85 per cent. was noticed.—Dr. Bruno Grützner, *Archiv der Pharm.*, 1892, 321.

Assay of crude carbolic acid.—Into a large beaker glass are weighed 100.0 each of the carbolic acid and of milk of lime (made by slaking one part lime with five parts water), the vessel placed in a steam-bath and heated for one hour with frequent stirring; an equal volume of water is then added and the mixture thoroughly stirred. The tarry and resinous constituents by this treatment form insoluble calcium combinations, while the phenol and cresol enter solution and the volatile substances are dissipated. After cooling the mixture is filtered, the residue washed with water and the filtrate decomposed by the cautious addition of hydrochloric acid; to easily separate the phenol and cresol the aqueous solution is saturated with salt, this causing the phenols to float upon the brine; after removing the phenols they are weighed without further purification. The commercial designation of crude carbolic acid is based upon the solubility in soda solution, an acid being called 100 per cent. if it dissolve clear in the soda solution. Treated by the above process, commercial crude carbolic acid of 25–30 per cent. assayed 2–3 per cent.; 40–60 per cent. assayed 3–5 per cent.; 80 per cent. assayed 50 per cent., and specimens marked 90–100 per cent. assayed 80 per cent. of phenol.—F. Seiler. *Schw. Wochenschr. f. Chem. u. Pharm.*, 1892, 365.

Mercuric oxide.—To determine the influence of temperature in the preparation of precipitated mercuric oxide C. Guldensteeden Egel-

ing made a number of experiments: (1) Cold mercuric chloride solution (1 : 20) added to a cold, dilute potassium hydrate solution gave an oxide, which dried, first between filtering paper, later in a desiccator, with oxalic acid solution (1 : 10) changed at once into the white mercuric oxalate. (2) The solutions of the same strength but boiling hot gave an oxide which required some time to react with oxalic acid solution. (3) As in 2, but the boiling continued for some time (replacing the evaporated water), a portion of the oxide being filtered out at intervals of one-half hour; the color of all the precipitates was pure yellow, but toward oxalic acid solutions they showed differences, the longer the boiling was continued the less were the precipitates affected by oxalic acid. It is therefore not possible to change the yellow oxide into the red by boiling. (4) Repeating the experiments of Bosetti (Am. Journ. Pharm., 1890, 446), but using potassium hydrate instead of barium hydrate, it was possible to prepare an oxide which in physical and chemical properties was not to be distinguished from the red oxide obtained by igniting mercuric nitrate; the details are as follows: Into a boiling mercuric chloride solution (1 : 5) boiling concentrated potassium hydrate solution was dropped until the dark-brown color of the oxychloride was changed to a bright red and the liquid reacted faintly alkaline; the mixture was then poured into about twenty times its volume of boiling water, the precipitate collected, washed and dried.—(*Ber. d. Niederl. Pharm. Ges.*) *Pharm. Ztg.*, 1892, 517.

Assay of Iodoform-gauze, etc.—If the material contain 5–10 per cent. iodoform, 4 grams are taken for the assay, if it contain more a smaller quantity suffices; the material is placed in a 100 cc. flask. 60 cc. alcohol added and boiled, using an inverted condenser, until the iodoform is dissolved. After cooling alcohol is added to fill up to the 100 cc. mark; of this solution a quantity is taken which represents from 200–300 milligrams of iodoform, placed in a flask connected with an inverted condenser, and boiled with a solution of 5 gm. potassium hydrate in 5 cc. water for one-half hour, or until some of the alcohol distilled over is odorless or gives no turbidity upon the addition of water; the solution is then evaporated to dryness, dissolved in water, acidified with nitric acid and the iodine determined with silver nitrate. In making the calculation allowance must be made for the space occupied by the material, thus if 4 gm. of a 10

per cent. gauze were used, the gauze occupied a volume of 3.6 cc., hence instead of having 100 cc. of the alcoholic solution there are only 96.4 cc.—G. H. Boldingh (*Ber. der Niederl. Pharm. Ges.*) *Pharm. Ztg.*, 1892, 517.

Ipecacuanha root.—The proportions of bark and woody portion in the three commercial varieties were found as follows:

	Bark. Per Cent.	Wood. Per Cent.
Rio best commercial root,	77	23
Rio inferior commercial root,	65.5	34.5
Carthagen commercial root,	84	16
Carthagen select root,	91.5	8.5
Singapore commercial root,	91	9

Rio ipecacuanha was found to yield 0.53–1.45 per cent. emetine, depending upon the quality of the root; Carthagen ipecacuanha from 0.9–1.85 per cent., the woody portion yielded 0.23 per cent. emetine; Singapore ipecacuanha gave 0.54 per cent. emetine. These assays were made by Kremel's method (see *Am. Journ. Pharm.*, 1892, 519).—Caesar & Loretz, *Apotheker Ztg.*, 1892, 464.

Kola-nut and cacao-nut constituents.—The investigations of Dr. E. Knebel (*Am. Journ. Pharm.*, 1892, 190), disclosing the fact that the kola-nut contained a glucoside which by decomposition gave rise to caffeine, glucose and kola-red, and rendering it very probable that fresh kola-nuts contained no caffeine, but only glucoside, has been verified by A. Hilger, who recently obtained fresh kola-nuts so as to perform the necessary analysis. Of other drugs yielding caffeine and theobromine a specimen of cacao-nut preserved in alcohol was examined, with results similar to those obtained from the kola-nut. There is present a glucoside which is decomposable by a diastatic ferment, also present in the fruit, into dextrose, cacao-red and a mixture of caffeine and theobromine; boiling water and warm dilute acids also bring about decomposition. The fresh fruit was found to be free from cacao-red, caffeine and theobromine. To isolate the glucoside from the commercial cacao-nut, the fat is removed by use of petroleum ether, the theobromine and dextrose by use of cold water, and then the glucoside extracted with alcohol; the solvent is carefully evaporated, leaving the glucoside, which is purified by repeated solution in very dilute potassium hydrate solution and

precipitation with dilute hydrochloric acid.—*Apotheker Ztg.*, 1892, 469.

Gelatinized infusion of digitalis.—Mention has been made in the *Am. Journ. of Pharm.*, 1892, 406 and 458, that the gelatinizing of the infusion is due to the action of a minute organism, *Micrococcus gelatinogenus*, upon cane sugar; in a recent paper upon the products of the alteration of cane sugar Dr. W. Braeutigam announces that there are produced dextran, dextrose and lævulose. The last is used as food by the organism, while to the formation of the first is due the gelatinizing. Dextran may be separated from the other products by precipitation with alcohol; it forms snow-white flakes, on a water-bath drying to a greenish-white, amorphous, horny mass, soluble in water. The aqueous solution with Fehling's solution gave a pale blue, slimy precipitate, without reducing the solution; precipitated with subacetate but not with acetate of lead; by heating with dilute acids dextrose was produced quantitatively. The solution has an insipid taste, and is strongly dextrogyre.—*Pharm. Centralhalle*, 1892, 534.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

Oil of geranium in oil of rose.—Dr. Panajotow (*Bulletin de la Société chim.*, May 20, 1892) gives the following tests for the detection of oil of geranium in oil of rose. (1) To 2 cc. of bisulphite of rosaniline, obtained by decolorizing fuchsine with sulphurous acid, are added two or three drops of the oil. If the oil is pure it slowly (within twenty-four hours) assumes a red color; should it, however, contain oil of geranium it is rapidly (in about two hours) colored blue; (2) Concentrated sulphuric acid yields with oil of geranium a brown mass which is not entirely dissolved by 95 per cent. alcohol, the solution being red and the flocculent particles yellow. Oil of rose treated in like manner yields a mass which is entirely soluble in alcohol, the solution being colorless.

Oil of santalwood.—E. Mesnard ascertained (*Jour. de Phar. et de Chim.*, August 15, 1892) that pure oil of santalwood, on being mixed with sulphuric acid, yields a viscous liquid, which becomes pasty and rapidly solidifies, the mass being of a light grayish-blue color and adhering firmly to the glass. If, however, adulterated

with oil of cedar, copaiba, cubeb or turpentine, the resinous mass produced does not completely solidify, and retains always a dark tint of a very distinct shade.

Crystallized ox gall of Flatner.—This is prepared (*Journ. de Pharm. d'Anvers*; *L'Union pharm.*, 1892, 382) by mixing the ox gall with charcoal and carefully evaporating to dryness. The residue is then treated with absolute alcohol, filtered, and to the filtrate ether is gradually added so as to form a perfect mixture. Crystals form gradually, which are separated and dried over sulphuric acid. The crystals are white, inodorous, of a slightly bitter taste and are very soluble in alcohol and water and insoluble in ether. The product consists of a mixture of glycholate and taurocholate of sodium.

Ambergris.—G. Pouchet (*Rép. de Phar.*, August, 1892) observed that different samples of ambergris, though differing in appearance, have a close resemblance in odor and composition. The drug consists of acicular crystals with a considerable proportion of blackish pigment and a certain quantity of excremental matters characterized by the presence of beaks of cephalopodes.

The microscopical and chemical examination of this product has led S. Jourdain (*Four. de Phar. et de Chim.*, Aug. 25, 1892) to regard it as analogous to intestinal calculi, but what particularly attracted his attention was the presence of a large number of the jaws of cephalopodes, either entire or in fragments. Some of these animals exhale a strong odor, which does not disappear after death or on drying. This peculiar perfume, modified by the biliary products of the sperm whale, constitutes the odor of ambergris. The black coloring matter of the latter is likewise due to cephalopodes, which contain it in considerable quantities.

Preparation of salol.—According to Ernst (*Rép. de Phar.*, August, 1892) nearly the theoretical quantity of salol is obtained by heating salicylic acid to between 160° and 240° C., and preventing access of air, while water is being disengaged. Salicylic anhydride is probably formed during the operation, and by its decomposition phenol is produced, which combines with unaltered salicylic acid to form salol.

Phenosalyl.—Prepared according to Dr. de Christmas (*Médecine moderne*, June 30, '92) phenosalyl is a mixture consisting of phenol 9 gm., salicylic acid 1 gm., lactic acid 2 gm., menthol 0.10 gm. In

preparing, the first three ingredients are heated until completely liquefied, and then the menthol is added. Phenosalyl is very soluble in glycerin, it dissolves in water in the proportion of 4 to 100. Phenosalyl is used as a disinfectant, being able to sterilize, in aqueous solution, tuberculous expectoration anthrax cultures.

Reaction between exalgin and salicylic acid.—On triturating these two compounds in a mortar, Dr. De Parel, of Dieppe, observed (*Rép. de Phar.*, July, 1892) that the mixture formed a soft paste which soon became liquid. These two chemicals should, for the reason stated, not be prescribed together in a solid form; but on replacing the salicylic acid by sodium salicylate, the difficulty is obviated.

A deodorant of iodoform.—According to *Revue des inventions techniques* (*Monit. de Pharm.*, 1892, 1138) oil of turpentine acts as a strong deodorant for vessels to which the odor of iodoform adheres. The vessels are well covered with turpentine (a thin layer is only necessary), and in about a minute are washed with soap and water (acts very nicely.—H. C. C. M.). See also *Am. Jour. Phar.*, 1891, p. 404.

Colored vegetation in distilled mint water.—H. Barnouvin noticed in a distilled mint water (*Rép. de Phar.*, July, 1892) an organic sediment which increased very rapidly. It consisted of groups of globular cells, having an orange-yellow color, destitute of mobility, and secreting a soluble pigment, imparting a yellow color to the water. The cells belonged to *Micrococcus aurantiacus*, Cohn.

Sodium ethylate, prepared by acting with sodium upon alcohol at 50° C., is stated to exert a favorable influence upon certain cutaneous affections. Prof. Gamberini, of Bologna, and Dr. Maroni (*Semaine médicale*) have used a two per cent. solution of this compound in olive oil as a lotion in a case of psoriasis, which completely disappeared in twenty days. Applying under a protective covering an aqueous solution of 10 per cent. sodium ethylate, very favorable results were observed in Paget's disease, erythematous lupus and in torpid ulcers of various origin.

Distinction between syrup of codeine and syrup of morphine.—Dr. Denigès (*Fourn. de Méd. de Bordeaux*, Aug. 7, 1892) uses Tanret's reagent for distinguishing between the syrups of the two alkaloids. The reagent is composed of potassium iodide 3.32 gm., corrosive sublimate 1.35 gm., distilled water 80 cc., acetic acid 20 cc. With

syrup of codeine the reagent gives a precipitate, or with syrup of 0.20 gm. to the kilo of syrup an opalescence appears, while with morphine syrup, even of the strength of 1.25 gm. hydrochloride to the kilo of syrup, no opalescence appears. Iodo-potassium iodide may be substituted for Tanret's reagent and yields good results.

Presence of strychnine in the brain.—In 1882 Gay, Schlagdenhauffen and Garnier found strychnine in the brain of a subject having died from a large dose of that alkaloid. Grandval and Lajoux have recently made a like observation (*Rép. de Phar.*, July, 1892) in a case of slow poisoning, in which only 42 mgm. of strychnine could be obtained from the stomach. It appears, therefore, that strychnine will be found in the brain after large or small doses have been taken, and after death has taken place, either slowly or rapidly.

Detection of copper sulphate in iron sulphate.—According to Vandepuut (*Journ. de Pharm. d'Anvers*; *Monit. de Pharm.*, 1892, 1107) copper cannot be detected in sulphate of iron by means of ammonia except when present in rather large proportion. When present in small quantities the ammonia does not form the blue copper solution. In the latter case the author dissolves the precipitate in nitric acid and places in the solution a bright piece of iron on which the copper when present is deposited.

Molybdate of ammonium as reagent.—F. Gigli (*Boll. chim. farm.*, xxxi, 1892, 235, through *Rép. de Pharm.*, 1892, 315) uses the following solutions for preparing the reagent for phosphoric acid extemporaneously. 15 gm. of commercial ammonium molybdate are dissolved in the minimum amount of ammonia and the solution diluted with distilled water to 100 cc. The second solution is nitric acid, sp. gr. 1.185, containing 30 per cent of HNO_3 . The solutions are mixed when needed, 1 cc. of the molybdate solution being added to 2 or 3 cc. dilute nitric acid, and to this the liquid to be tested. In presence of phosphoric acid a lemon-yellow precipitate rapidly appears without the application of heat, one condition being that the testing be carried on in a slightly acid solution.

Volumetric determination of phosphoric acid.—M. Spica (*Gazz. chim. ital.*, 1892, 117, through *Rép. de Pharm.*, 1892, 316), estimates the phosphoric acid by means of ferric phosphate, which is precipitated completely in neutral solution. The reagent is a solution of

iron-ammonia alum and is regulated so that 1 cc. = .001 gm. P_2O_5 , being titrated preferably with a solution of phosphate of ammonium, 2.9439 gm. to a litre. After obtaining the phosphates in solution (iron, aluminium and manganese being eliminated), it is exactly neutralized with a caustic alkali, using phenolphthalein as indicator; to this solution is added a small quantity of salicylic acid and the above reagent is used for titration. Toward the end of the operation it is best to allow the precipitate to settle, so as to observe with better advantage the end of the reaction, which is indicated by a violet coloration.

ON THE IODIDES OF SULPHUR¹

By Prof. HERBERT MCLEOD, F. R. S.

An iodide of sulphur, SI_6 , isomorphous with iodine, was prepared by Landolt and measured crystallographically by Vom Rath (*Poggendorff's Annalen*, cx, 116). It was made by allowing a solution of iodine and sulphur in carbonic disulphide to evaporate spontaneously. As the existence of this compound has been adduced as a proof of the hexad character of sulphur, it seemed advisable to investigate its properties.

Some of the substance was prepared by the process mentioned, and in order to separate it from any admixture of iodine, it was placed in a tube which was afterwards exhausted by the Sprengel pump and sealed. One end of the tube was then surrounded by muslin kept wet with water by means of a piece of cotton wick; iodine volatilized, at first rapidly but afterwards more slowly. After the lapse of three months a residue was left at the end of the tube which, on analysis, was found to contain 98.5 per cent. of sulphur.

Another quantity was dissolved in carbon disulphide and the solution allowed to evaporate; as crystals were formed the liquid was poured off and the crystals washed with carbonic disulphide. In this manner five crops of crystals were obtained, none of which contained more than half a per cent. of sulphur; the residue left on allowing the mother-liquor to evaporate contained 56 per cent. of sulphur.

The iodine is entirely removed from the substance by digesting it in a solution of potassic iodide.

¹ Read before the British Association, Edinburgh Meeting, 1892, Section B, reprinted from *Chem. News*, Sept. 2.

When some of the powdered substance is exposed to the air in a shallow layer, the iodine all volatilizes, leaving a residue of sulphur.

When acted on by a solution of sodic hydrate, a residue of sulphur is left, and the solution gives very little precipitate with baric chloride after acidifying with hydrochloric acid.

The properties of the substance seem to indicate that it is a mechanical mixture of iodine and sulphur and not a chemical compound.

Some experiments were then made with the iodide of sulphur, S_2I_2 , described by Guthrie. This was prepared by mixing chloride of sulphur, S_2Cl_2 , with ethylic iodide, and allowing the mixture to remain in a sealed tube for four days. Black crystals were then found in the tube. On opening the latter a large quantity of the vapor of ethylic chloride escaped.

The crystals were removed from the tube and powdered. On heating a portion in a test-tube it fused at a temperature a little above the boiling-point of water.

Some of the substance *in vacuo* gave off iodine, leaving a light colored residue. Some of the substance dissolved in sulphide of carbon was crystallized fractionally; the first crop contained 0.38 per cent. of sulphur; the second 0.31; the third 1.07; and the fourth 34.78. On allowing the mother-liquor to evaporate, the residue contained 76.32 per cent. of sulphur.

When acted on by a solution of sodic hydrate the iodine is removed and all the sulphur remains behind, the solution giving no precipitate with baric chloride after adding hydrochloric acid. It is usually stated in text-books that the compound undergoes a decomposition similar to that of the chloride of sulphur, forming an iodide and a sulphite or thiosulphate, with separation of sulphur.

The fusing-point being lower than those of iodine and sulphur would indicate that some chemical action takes place when the elements are mixed together, but its properties more resemble those of a non-metallic alloy than of a definite chemical compound.

SEPARATION OF IODINE, BROMINE AND CHLORINE.¹

BY C. SCHIERHOLZ.

When each of the three halogens is present in fair quantity, the author adopts an indirect method, in which two weighings only are

¹ *Monatsh.*, **13**, 1-39; *Jour. Chem. Soc.*, 1892, p. 1028.

necessary. Two equal volumes of the neutral solutions, in which the halogens are to be determined, are measured out, and one of them is accurately titrated with a 1/20 normal silver nitrate solution. The number of cc. required, *a*, and the weight of the silver precipitate, *b*, are accurately determined. The second portion of the solution is treated with a few grams of potassium bromide, and the same volume of the silver nitrate solution as was required to precipitate the halogens in the first portion, is added. The solution is boiled for some time, diluted with water, and the weight, *c*, of the resulting precipitate, which contains all the iodine, all the silver, and some bromine, is noted. By means of the three values, *a*, *b* and *c*, the quantity of each halogen present can be readily calculated.

If only a small quantity of iodine and bromine is present with relatively much chlorine, the method of estimation depends on the facts that silver iodide is insoluble in moderately concentrated solutions of sodium chloride, and that bromine and chlorine can be separated by distillation with solutions of potassium permanganate and aluminium sulphate. For the latter process, the author employs a distillation apparatus, consisting of a retort and condenser, and made of glass in one piece, the last portions of the bromine being expelled by boiling with a little dilute sulphuric acid. The bromine is absorbed in a flask containing dilute ammonia, whereby it is converted into ammonium bromide and probably partly into ammonium hypobromite; the whole of the bromine is, however, precipitated as silver bromide, on adding silver nitrate to the solution. This method of separating the iodine is only available when (say, in a mixture of sodium salts) it is present in the proportion of not more than 1 part of iodide to 6 or 7 of bromide and 1,000 of chloride, under which circumstances, on the addition of a little silver nitrate, only silver iodide is precipitated, since silver bromide and silver chloride are soluble in strong sodium chloride solution. If, however, more bromide, or more iodide and bromide, are present than is indicated by the above-given ratio, it is best to precipitate and estimate the iodide as palladium iodide.

In making the above separations, the author has incidentally investigated the solubility of silver chloride, bromide, and iodide in solutions of the halogen salts of the alkalies, more particularly in sodium chloride. Such solutions dissolve 4-5 times as much of the halogen salts of silver at their boiling point, as at the ordinary tem-

perature. The concentration of the solution of the halogen salts of the alkalies has also a marked effect on the solubility of the silver compounds; a 10 per cent. solution of sodium chloride and a 1 per cent. solution of potassium iodide dissolving scarcely any recognizable quantity of the corresponding silver compounds. The very great difference between chlorine and iodine is shown both in the relative solubility of silver chloride and silver iodide, and in the different solvent power of the halogen alkali salts on silver nitrate, silver chloride, etc.; bromine occupying a position between chlorine and iodine. For example, 100 grams of sodium chloride or of potassium chloride in a 20 per cent. solution dissolves hardly a trace of silver iodide, whilst 100 grams of potassium iodide in concentrated solution dissolves about 90 grams of the salt, and a boiling saturated solution dissolves 4-5 times that quantity. Mixtures of the halogen salts of the alkalies, in particular proportions, are unable to dissolve as much of the silver salt as each can before admixture.

A SIMPLE METHOD FOR DETERMINING THE WATER IN IODINE.

BY PROF. DR. MEINCKE.

For determining the water or crystallization in iodiferous substances readily capable of decomposition, E. Ostermeyer passes the vapors of iodine and water, by means of a current of air, through a moderately heated combustion tube filled with spirals of sheet silver or copper, and allows the watery vapors, freed from iodine, to be absorbed in weighed drying tubes. When it is merely required to determine relatively small quantities of iodine, the metal spirals do good service; but as the proportion of moisture in iodine is generally small, it is desirable to take for its determination not too small a quantity of the material. Hence the danger that the iodine may escape absorption by the spirals is increased, except they are made of an inconvenient length.

My procedure, in which this risk is not merely obviated, but the apparatus is of the utmost simplicity, is as follows:

The iodine to be examined is allowed to fall from the weighing-glass into a test-tube of about 1 cm. in width and 6 cm. in length; it is at once superstratified with from four to five times its quantity of silver powder, previously ignited; the tube is closed with a glass stopper, ground to fit its mouth, and weighed immediately; or, if

in case of a high temperature of the air, the silver is being attacked by the iodine on mutual contact, not until completely cold. The open tube, which may be set in a small beaker, is heated upon an asbestos plate, so gently that only a very slow formation of silver iodide takes place. As this reaction can always be observed, it may be easily regulated in case of need by removing the beaker from the asbestos plate. With experience, which is easily acquired, there is no risk of the escape of even traces of iodine. Should it really occur, it would be inevitably shown by a change of the color of the silver powder; the silver powder then appears attacked to its upper layer, whilst if the operation is correctly managed, the upper portions of the silver must remain unchanged. During the formation of silver iodide, the water which escapes is condensed in the colder parts of the tube, from which, after the complete absorption of the iodine, it is expelled by a higher temperature. When this takes place, the tube is stoppered up, allowed to cool, and weighed. The difference shows the quantity of water which has been present in the iodine. The determination, with all the preparations, scarcely requires one hour.

The method allows of an accurate determination of moisture in iodine, even if chlorine and bromine are simultaneously present; it loses, however, its trustworthiness if considerable quantities of cyanogen are present.—*Chemiker Zeitung*; *Chem. News*, Sptb. 16, 1892, p. 144.

VOLUMETRIC ESTIMATIONS AND ANALYTICAL SEPARATIONS BY MEANS OF POTASSIUM FERROCYANIDE AND FERRI- CYANIDE.¹

By C. LUCKOW.

The use of potassium ferrocyanide is somewhat restricted, as so many ferrocyanides are insoluble. For instance, in the important titration of zinc ores it is necessary to remove iron and other metals before titrating with the ferrocyanide. The author, therefore, has made an attempt to introduce ferricyanide instead. Having prepared a potassium ferricyanide free from sulphates and chlorides, it was found that this substance may be used in acid solutions even in

¹ *Chem. Zeit.*, **15**, 1491; *Jour. Chem. Soc.*, 1892, p. 1129.

presence of ferric oxide, and that no precipitates are formed in presence of mercuric, lead, manganoous, uranic and stannic salts.

These different properties of the two double iron cyanides render it possible to estimate some metals volumetrically in presence of one another, or to estimate them gravimetrically, as most ferricyanides may be readily filtered off. Zinc, for instance, may be accurately estimated either volumetrically or gravimetrically by means of potassium ferricyanide in its acetic or nitric acid solution, even in presence of lead, which may then be titrated in the filtrate with potassium ferrocyanide. Tin may be titrated by means of potassium ferrocyanide, even in presence of arsenic and antimonious acids, after the solution has been evaporated with oxalic acid and then mixed with a little dilute sulphuric acid.

The ferricyanide solution should give no coloration with a uranium solution, and no precipitate with a lead salt. If it should do so, it must be mixed with a little chlorine-water, and the salt recrystallized.

When titrating with ferrocyanide or ferricyanide, it is not possible to add the indicator straight to the liquid under examination, but use must be made of test papers. The indicator used must show either the disappearance of the last trace of the metal or else the slightest excess of the precipitant.

The author prepares his test papers as follows: A moderately thick but dense and smooth kind of filter paper is cut into strips of 30 cm. in length and 15 cm. in width. Across the narrow part, at a distance of about 4 cm. from each other, stripes are made with the solution of the indicator, which consists of cupric acetate or ferric chloride, if ferrocyanide is used; or cobaltous or ferrous sulphate, when a ferricyanide is employed in the titration. When both are used in succession, a mixture of ferrous ammonium sulphate and ferric chloride is used.

When apparently enough of the ferrocyanide or ferricyanide solution has been added to the solution to be tested, a little drop is taken out by means of a thin pencil and put at a distance of about 5 mm. from one of the stripes, when the reaction will make its appearance if the least excess is present.

The author recommends using for the titration not more than 30 cc. of liquid containing about 0.15 gram of metal. The process may also be performed by adding an excess of the reagent and titrat-

ing this in the usual manner. But amongst the ferrocyanides there are some, like the zinc, nickel and cobalt salts, which are very difficult to filter off, although this presents no difficulty with mercury, lead and silver salts. The ferricyanides are, however, more easily filterable.

BENZOYL-PSEUDOTROPEINE (TROPACOCAINE?).

This base occurs, associated with cocaine, cocamine, cinnamyl-cocaine and other bases, in Java coca leaves, and to some extent in other coca leaves. It was first recognized by Giesel,¹ who separated the base in the form of a hydrobromide, but did not describe the method by which the separation was effected. The chief points of difference from cocaine were the melting point of 49° C., and the comparatively lesser solubility of the hydrobromide and the nitrate. The hydrochloride also differed from that of dextro-cocaine and the base was, moreover, optically inactive. Further investigation by Liebermann² showed that the composition of this base was not analogous to that of cocaine, and that when split up under the influence of hydrochloric acid it yielded, instead of ecgonine, a base isomeric with tropine from atropine but, having a much higher melting point than that, it was considered to be identical with the base obtained by the similar splitting up of hyoscine. The other product of the transformation being benzoic acid, the new coca base was named *benzoyl-pseudotropeine*, and Liebermann succeeded in reproducing it synthetically. At the meeting of the British Medical Association, at Nottingham, attention was directed to this base by Dr. A. P. Chadbourne, of Boston, U. S. A., who, in a paper read before the Section of Pharmacology and Therapeutics,³ described the results of an extended investigation carried out in the Pharmacological Institute of Berlin University with the assistance of Professor Liebreich and Dr. Langgaard. He showed that in many respects the physiological action of this base differs from that of cocaine. It is a powerful local anæsthetic; but in the eye does not cause the ischæmia characteristic of cocaine, or the marked irritation and hyperæmia produced by the group of substances which Liebreich has termed *anæsthetica dolorosa*. It was found to be

¹ *Pharm. Zeitung*, July 4, 1891.

² *Berichte*, xxiv, 2336; *Amer. Jour. Phar.*, 1892, 44.

³ *British Medical Journal*, August 20, 1892, p. 402.

only half as poisonous as cocaine; local anæsthesia was produced more rapidly than by cocaine, and apparently by less concentrated solutions. Dr. Chadbourne proposes to substitute for the name benzoyl-pseudotropeine that of "*tropacocaine*" as being more suited for medical use, and suggestive of the chemical relations of this base to atropine and cocaine. That name, however, would be chemically inappropriate because the base is not an analogue of cocaine, but is really one of the class named by Ladenburg "*tropeines*."

In the last number of the *Annalen*, Dr. O. Hesse has given a statement of the results obtained by him in the examination of benzoyl-pseudotropeine and the products of its decomposition. The base has the form of colorless plates of fatty lustre; it melts at 48° (Liebermann gives 49° C.), but in other respects the observations of Hesse agree with those of Liebermann. The composition of the base is represented by the formula $C_{15}H_{19}NO_2$.

The *hydrochloride*, $C_{15}H_{19}NO_2 \cdot HCl$, is very soluble in water. When crystallized from alcohol it has the form of large rhombic crystals, and when precipitated from alcoholic solution by ether the form of extended laminæ. The salt melts at 269° C. (Liebermann gives 271° C.), and it is scarcely soluble in ether. Its water solution is optically inactive.

The *platinum salt* $(C_{15}H_{19}NO_2)_2 \cdot PtCl_6 \cdot H_2O$, obtained by precipitation, forms small pale yellow needles sparingly soluble in water. Liebermann described the salt as amorphous.

On treating a solution of benzoyl pseudotropeine in methylic alcohol with methyl iodide, colorless crystals soon separate, which consist of *benzoyl-pseudotropeine-methyl iodide*, $C_{15}H_{19}NO_2 \cdot CH_3I$, which is tolerably soluble in hot methylic or ethylic alcohol. The corresponding *chloride*, $C_{15}H_{19}NO_2 \cdot CH_3Cl$, obtained by treatment with freshly precipitated silver chloride, crystallizes on evaporating the solution in stout prisms or needles. The *platinum salt* $(C_{15}H_{19}NO_2 \cdot CH_3)_2 \cdot PtCl_6 + 2H_2O$, has the form of orange-colored needles, sparingly soluble in cold water. The *gold salt*, $(C_{15}H_{19}NO_2 \cdot CH_3)_2 \cdot AuCl_4$, has the form of a yellow crystalline precipitate, sparingly soluble in cold water. When a water solution of the iodide is shaken with freshly precipitated silver oxide a strongly basic solution of the benzoyl-pseudotropeine hydroxide is obtained, and on evaporating this solution in the exsiccator an almost colorless residue is obtained, which is readily soluble in water.

Liebermann stated that by the splitting up of benzoyl-pseudotropeine with hydrochloric acid it was converted into benzoic acid and a base which he regarded as being identical with that obtained from hyoscine by Ladenburg. Hesse has, however, found that the base produced from *hyoscine* has a different composition from pseudotropeine, and it has been named by Hesse *oscine*.¹

After separating the benzoic acid, produced by the action of hydrochloric acid upon benzoyl-pseudotropeine, and evaporating the acid solution a crystalline residue is obtained, from which the base formed by the splitting up of benzoyl-pseudotropeine can be obtained by adding caustic soda and shaking with chloroform. On evaporating the chloroform solution the *pseudotropeine* remains in the form of prisms, which gradually become moist on exposure and melt at 108°. In other respects it agreed with Liebermann's description, and as the formula of benzoyl-pseudotropeine is $C_{15}H_{19}NO_2$ the base can only have the composition represented by the formula $C_8H_{15}NO$, as Liebermann found was the case.

The *pseudotropeine hydrochloride* crystallizes, on evaporating the water solution, in the form of long needles which rapidly deliquesce. On adding to the solution platinum chloride, the platinum salt soon crystallizes out as orange-red tabular crystals readily soluble in water. On evaporating the solution the salt crystallizes in fine prisms. In both cases the crystals have a marked lustre, which they rapidly lose on warming from loss of water of crystallization. At 100° C. the salt becomes anhydrous and then it melts at 206° C. Analysis gave results agreeing with Liebermann's formula— $(C_8H_{15}NO)_2, PtCl_6H_2 + 4H_2O$.

The *gold salt* has the form of yellow laminæ, and melts at 202°. Liebermann gave 225° C.

Pseudotropeine combines readily with methyl iodide, solidifying with evolution of heat. After recrystallization from water the compound has the form of colorless rhombohedral crystals generally grouped like those of ammonium chloride. It is anhydrous and melts at 270° C. The chloride has the form of stout rhombohedral crystals, which are anhydrous, readily soluble in water, sparingly in alcohol. The platinum salt is anhydrous, melts at 216° C., and crystallizes well from hot water. Pseudotropinemethylhydroxide becomes brown on evaporating its water solution in the exsiccator.

—*Phar. Jour. and Trans.*, Sept. 24, p. 241.

¹ *Pharm. Journ.*, xxii, 222.

RESEARCH ON THE ACIDS OF BUTTER.¹

BY EMIL KOEFOED.

785 grammes of a butter fat giving 15.1 cc. Reichert figure (by Nilson's modification, *Z. für Anal. Chemie*, 28, 175), were saponified with 200 grammes caustic soda in 500 cc. of water; the soap was decomposed by 300 grammes of sulphuric acid diluted with 500 cc. of water, and the liquid boiled under an inverted condenser till the soap was all decomposed, a current of carbon dioxide being passed through the flask. The fatty acids (720 grammes) were filtered, and the aqueous filtrate shaken three times with ether, which, on distillation, left 6 grammes of acids smelling like butyric. This extraction with ether was proved to have removed the whole of the organic acids. The 6 grammes constituted Portion I.

The 720 grammes of acids left on the filter were distilled under 30 mm. pressure. The acids distilling between 93° and 200° weighed 54 grammes, and constituted Portion II.

The remaining acids were dissolved in 500 grammes of alcohol of 95° Tralles, and were several times crystallized from this medium; 100 grammes were thus obtained.

The whole of the alcoholic filtrates (about 4 litres) were, after the addition of 30 gm. of acetic acid, treated with an alcoholic solution of 600 grammes of crystallized lead acetate. The precipitate was collected after 24 hours on a filter, washed with alcohol, and air dried. The acids were then set at liberty by boiling with hydrochloric acid, and weighed 314 grammes, which, with the 100 grammes obtained by crystallization, formed Portion III.

The filtrate was made faintly alkaline with ammonia, and a small quantity of a semi-fluid lead salt separated, probably Gottlieb's oxyoleate of lead. This was boiled with hydrochloric acid, and the acid thus obtained dissolved in ammonia, and its barium salt precipitated by barium chloride. This formed Portion IV.

From the filtrate the alcohol was removed by distillation, and the fatty acids transformed into barium salts as above. These constituted Portion V.

The Portions were then examined.

Portion V. The barium salts were boiled successively with acetic ether and chloroform. From the acetic ether solution, oleate

¹ *Bulletin de l'Academie Royale Danoise*, 1891; *The Analyst*, 1892, p. 130.

of barium separated on cooling. This was recrystallized from 80 per cent. alcohol, and then gave 19.38 per cent. Ba; calculated for barium oleate, 19.59.

The chloroform solution gave, after cooling and filtering, on the addition of four volumes of ether, a white amorphous precipitate, which, on drying, became a brown, gummy amorphous mass. Upon analysis its composition was found to be Ba. $(C_{15}H_{27}O_4)_2$. The author regards this acid as $C_{15}H_{28}O_4$. It easily decomposed, as after some time its barium salt becomes insoluble in chloroform.

Portion IV. This is insoluble in ether, acetic ether and chloroform. The analysis led to the formula $C_{29}H_{54}O_5$ (dibasic)¹ for the acid.

Portion III. This portion was fractionated under 30 mm. pressure; Brühl's receiver (*Ber.*, 1888, 3339) being employed. Fractions were collected: A 200° — 230°; B 231° — 238°; C 240° — 242°; D 244° — 248°; E 251° — 255°. The two last fractions were crystallized from a small quantity of alcohol.

The fractions B — E were fractionally precipitated by quantities of 25 cc. of a normal magnesium acetate solution. The fractions were then boiled with hydrochloric acid, and the melting points of the acids taken; they were then transformed into silver salts, and the silver estimated. Fraction E_i melted at 68°; after re-fractionating the melting point rose to 69°, and the silver salt contained 27.57 per cent. Ag. (calc. for stearic acid 27.62 per cent.). E_{iii} melted at 62°, and its silver salt gave 29.73 per cent. Ag. (calc. for palmitic acid 29.75 per cent.).

Fraction E was then principally palmitic acid with a small quantity of stearic acid. Arachidic acid was not detected.

Fraction D was also palmitic acid.

Fraction C (weighing 131 grammes) was dissolved in 700 grammes of alcohol, and deposited, after 24 hours, 31.5 grammes of solid acids, principally palmitic acid; the remainder was fractionally precipitated by magnesium acetate, seven fractions being obtained. *Fractions C_{iii}—C_{vii}* were magnesium myristate; the acid fused at 53° and the silver salt contained 32.22 per cent. Ag. (calculated for myristic acid 32.24 per cent.).

Fraction B still contained myristic acid; B_{iv} and B_v were, however, lauric acid, for the acid melted at 43.5°, and the silver salt

¹ Probably a mixture.

contained 35.35 per cent. Ag. (calculated for lauric acid, 35.18 per cent.).

Fraction A was neutralized with ammonia, and fractionally precipitated by 5 portions of 20 cc. of normal alcoholic silver nitrate.

A_{iii} — A_v corresponded to silver caproate.

Portion II. This was fractionated as fraction III A by means of 10 portions of silver nitrate. These were washed with alcohol, boiling water, and again alcohol, and air dried.

Fraction 4 contained a percentage of silver corresponding nearly to silver caprylate; it was, therefore, refractionated, and a series of precipitates were obtained corresponding exactly to silver caprylate.

Fractions 5--10 were chiefly silver caproate. In order to decide whether this was normal caproic acid or isobutylacetic, the author determined the solubility of the calcium salt. 100 cc. of water at 17.5 dissolved 2.58 grammes of anhydrous calcium salt. Lieben (*Ann.* 165, 118) has shown that at 18.5° 100 cc. of water dissolves 2.707 grammes of normal calcium caproate and 11.3 grammes of calcium isobutylacetate. Butter, therefore, contains normal caproic acid.

Portion I. This was principally butyric acid. The silver salt, after crystallization from water, gave 55.27 per cent. Ag. (calculated for butyric acid, 55.38 per cent.). Grönzweig (*Ann.* 162, 215) has already shown that the butyric acid in butter is normal.

The butter then examined contained 91.5 per cent. of fatty acids, of which the percentage composition is as follows:

Oleic Acid	
Acid of the formula $C_{15}H_{28}O_4$	} 34.0
" " " $C_{29}H_{54}O_5(?)$	
Stearic Acid,	2.0
Palmitic Acid,	28.0
Myristic Acid,	22.0
Lauric Acid,	8.0
Capric Acid,	2.0
Caprylic Acid,	0.5
Caproic Acid,	2.0
Butyric Acid,	1.5
	100.0

Euphorbia pilulifera administered in the form of fluid extract has been found useful by Dr. E. S. Blair (*Therap. Gaz.*, March, 1892) in hay asthma, not only in the primary attack, but also in cutting short any recurrence of the affection.

LIGNITE TAR.¹

BY F. HEUSLER.

A quantity of the lighter portions of the distillate from lignite tar was fractionated after treatment with dilute acids and alkalis. On distillation at ordinary pressures, decomposition sets in at about 180°. The oil is readily attacked in the cold by potassium permanganate in dilute sulphuric acid solution. A quantity (1,950 cc.) of the oil boiling at 148–162° was treated with potassium permanganate (167 grams) in the cold until the action was over. On steam distillation, an oil (1,208 grams) boiling at 130–165° was obtained; the largest fraction (328 grams) of this distilled at 145–150°. The lower boiling parts of the crude tar oil are acted on with explosive violence by nitric acid. After treatment with potassium permanganate, however, nitration proceeds quietly; the greater portion of the oil dissolves with evolution of gas, and on pouring the acid solution into water, a heavy oil separates which is partially soluble in soda. A considerable proportion, however, remains undissolved, and consists of nitro-derivatives of aromatic hydrocarbons.

On fractional bromination in the cold of the oil dissolved in ether, a product is obtained which may be separated by steam distillation into a light and a heavy oil. The lighter portion consists of bromo-derivatives of aromatic hydrocarbons.

Lignite tar oil is readily acted on by concentrated sulphuric acid with evolution of sulphurous anhydride. The oil (15 parts), if agitated first with a mixture of water (1 part) and concentrated sulphuric acid (2 parts) and then with a mixture (4½ parts) of water (1 part) and concentrated sulphuric acid (3 parts), yields an oil which, on steam distillation and subsequent fractionation, is found to be similar to that obtained by oxidation with permanganate and to have a strongly aromatic odor. The fraction of this oil, boiling at 80–93° was found, by nitration, to contain about 34 per cent. of benzene. The fraction boiling at 100–110° of the oil obtained by the treatment with permanganate, described above, was found by nitration to contain about 45 per cent. of toluene. Derivatives of metaxylene and mesitylene were also recognized among the products of nitration. The fraction boiling at 135–140° of the oil

¹ *Berichte*, **25**, 1665–1678; *Jour. Chem. Soc.*, September, 1892, p. 1075.

obtained by treatment with permanganate contained about 30 per cent. of aromatic hydrocarbons.

On nitration of the oil, a certain quantity was always unattacked; this consists of naphthenes, and the proportion increases as the boiling point of the oil rises, and varies from 14.5 per cent. in the fraction boiling at 90–100° to 33.3 per cent. in the part boiling at 300°.

No evidence of the presence of terpenes in the oil could be obtained on treating the oil by Wallach's methods. Indene and cumarone, also, could not be detected. The fraction boiling at 180–240° was found by treatment with picric acid to contain 4–5 per cent. of naphthalene.

NITRATED SILK.¹

BY L. VIGNON AND P. SISLEY.

When silk is immersed in ordinary nitric acid (sp. gr. 1.133) at 45° for one minute, and is subsequently washed in water, it is colored intensely yellow, and the color is unaffected by exposure to air and light, whilst it is deepened by the action of dilute alkali solutions. Nitric acid free from nitrous compounds does not cause this coloration, which is found to vary in intensity directly with the amount of nitrous compounds present, and with the temperature and specific gravity of the acid used. The deepening of color by alkaline solutions is independent of their causticity, whilst the silk increases in weight and takes up a certain amount of the base.

Silk treated with a mixture of hydrochloric acid and sodium nitrite is colored pale yellow; the color is rapidly browned on exposure to air and light, or by the action of boiling water or alcohol, whilst cold alkaline solutions turn it reddish-brown. Silk which has been subjected to the action of nitrous acid, or of nitric oxide, in an atmosphere of carbonic anhydride, and subsequently well washed, is colorless, but is colored a stable yellow by nitric acid. Nitric peroxide colors silk yellow at once. Silk heated with nitrous acid, and then oxidized with potassium permanganate and hydrochloric acid, is colored exactly as by nitric acid (impure), from which it seems that the yellow coloration is dependent on the action of nitrous compounds, and subsequently of an oxidizing agent.

¹ *Bull. Soc. Chim.* [3], **6**, 898; *Jour. Chem. Soc.*, September, 1892, p. 1111.

The yellow color is discharged by acidified stannous and chromous chloride solutions. Analyses of the nitrated silk show that about 2 per cent. of nitrogen is fixed in the reaction, probably, primarily, as the nitroso-group, which the further action of the nitric acid converts into the nitro-group, a carboxyl group being displaced. The properties of the product somewhat resemble Mulder's xanthoproteic acid, but this contains more carbon and less nitrogen, and results from a more intense action. Sulphuric acid dissolves ordinary silk gradually to a slightly colored solution, whereas nitrated silk is converted into a pale-yellow, viscid mass. Aqueous potash dissolves ordinary silk in the cold, and nitrated silk on heating; neither solution is precipitated by dilution with water, and both evolve ammonia when heated. Both varieties of silk are dissolved by hydrochloric acid and by zinc chloride solution.

Ammoniacal vapors are evolved on distillation of each variety, and a carbonaceous residue is left. On ignition, nitrated silk burns more rapidly than ordinary silk.

NOTES RELATING TO THE SOLANACEOUS BASES.¹

BY DR. O. HESSE.

Solanaceous plants contain a number of bases which yield by the action of alkalis or of acids tropic acid, or derivatives of that acid, together with volatile bases, and in that respect present relations with each other. Some of these solanaceous bases are extensively used in medicine, as, for instance, atropine, while others are of interest only in their scientific relations.

Although the preparation of these bases has now acquired a high degree of perfection, as may be inferred even from the external appearance of most of the commercial articles now referred to, it now and then happens that these articles possess characters which do not quite agree with published statements. These differences, as well as Liebermann's statement² that the volatile base obtained by the splitting up of a coca base is identical with the pseudotropine originally prepared from hyoscyne by Ladenburg,³ induced me to undertake a further investigation of this subject, the results of which I will now describe. I have also briefly touched upon apoatropine in reference to the communication of E. Merck⁴ on that base, though I have not been able to make any experimental examination of it.

(1) ATROPINE.—Under this name published statements are to be understood as indicating a base obtained principally from *Atropa Belladonna*, and melting

¹ *Annalen der Chemie*, vol. 271, p. 100. Reprinted from *Phar. Jour. and Trans.*, September 10 and 17.

² *Berichte*, xxiv, p. 2339.

³ *Annalen*, cvi, p. 299.

⁴ In his *Jahresberichte*, January, 1892.

between 115° and 116° . In commerce it is termed also "heavy atropine" or "atropinverum."

For the preparation of this base I selected the commercial sulphate in a state of absolute purity. A solution of the salt in water was mixed with excess of ammonia and shaken out into chloroform. On evaporating the chloroform solution the base was obtained, partly in the form of delicate white needles and partly as brilliant prisms melting at $115^{\circ}5$. A solution in absolute alcohol gave for $p = 3.22$ and $t = 15^{\circ}$ $[a]_D = -0.4$. Will stated¹ that atropine in alcoholic solution has no rotatory power; but subsequently he, together with Bredig,² found the rotatory power to be -1.89 . On the contrary, Ladenburg³ is of opinion that atropine is optically inactive, though he admits that he could not obtain it in a perfectly inactive state.

Neutral Sulphate.—In ophthalmic practice atropine is not used in the free state, but as a sulphate which is required by the German Pharmacopœia to be of great purity. The samples of the salt which I examined answered all the prescribed requirements; but, with one exception, they contained some hyoscyamine salt. The presence of this salt may be readily ascertained by mixing a solution of the salt to be examined in absolute alcohol with ether until a milky turbidity is produced. After some short time the turbidity disappears, and when hyoscyamine is present the salt separates in the form of dull, crystalline masses; but in the absence of hyoscyamine salt the atropine sulphate takes the form of long, brilliant, loosely connected needles. Atropine sulphate contains water of crystallization which is easily removed at 100° . The composition of the salt is represented by the formula $(C_{17}H_{23}NO_3)_2 \cdot SO_4H_2 + H_2O$. The water solution gives for $[a]_D = -8^{\circ}8$ when $p = 2$ (anhydrous) and $t = 15^{\circ}$.

The platinum salt, obtained by mixing a moderately concentrated solution with platinum chloride and evaporating the clear solution, crystallizes in tabular form, it is anhydrous and melts at $197-200^{\circ}$, according as it is rapidly or slowly heated.

The gold salt, obtained by precipitating the slightly warmed sulphate solution with gold chloride, separates partly as an oily mass, which soon becomes crystalline, and partly in small moss-like aggregates of laminæ, which have no lustre after drying in the air. The melting point of the crystalline salt is near 138° , while that of the first-mentioned form is generally about 3° lower.

The neutral oxalate, $(C_{17}H_{23}NO_3)_2 \cdot C_2O_4H_2$, obtained by very gradually adding to a solution of the base in acetone an ether solution of oxalic acid, separates in warty crystalline masses consisting of short anhydrous prisms. The salt is but sparingly soluble in hot alcohol, and separates on cooling the solution in granular masses; it melts at 176° .

(2) *HYOSCYAMINE.*—This base was prepared partly from the seed of *Hyoscyamus niger*, partly from the sulphate obtained from Trommsdorff, and also, as I was informed, prepared from *Hyoscyamus niger*. No difference between these preparations could be detected, but the following data could be determined only with the base prepared from Trommsdorff's salt, which proved to

¹ *Berichte*, xxi, p. 1724.

² *Ibid.*, xxi, p. 2792.

³ *Annalen*, ccvi, p. 282, and *Berichte*, xxi p. 3065.

be quite pure. It was prepared from the sulphate in the same way as atropine, and after evaporating the chloroform solution it remained in the form of delicate needles, melting at $108^{\circ}5$. A solution in absolute alcohol gave for $[a]_D - 20^{\circ}3$ when $p = 3.22$ and $t = 15^{\circ}$. Ladenburg¹ found $-14^{\circ}5$, Will² $-21^{\circ}68$. Hammerschmidt states³ that a variation in the strength of the alcoholic solution, from 1 to 12, has no influence upon the rotary power of hyoscyamine. Analysis confirmed the formula $C_{17}H_{23}NO_3$.

The neutral sulphate $(C_{17}H_{23}NO_3)_2SO_4H_2 + 2H_2O$ as obtained from Trommsdorff on several occasions, was in the form of delicate needles, which became dull at 100° , owing to loss of water, and melted at 201° . The salt dissolves readily in water and in hot alcohol, and is precipitated from the latter solution as small concentrically grouped needles. It is insoluble in ether, but slightly soluble in hot acetone, separating in small white needles on cooling the solution. The anhydrous salt gave for $[a]_D - 28^{\circ}6$ when $p = 2$ and $t = 15$.

The platinum salt $(C_{17}H_{23}NO_3)_2PtCl_6H_2$, obtained by mixing a solution of the sulphate with platinum chloride and evaporating slowly, crystallizes in fine orange prisms; it is anhydrous and melts at 206° , as already stated by E. Schmidt.

The gold salt $C_{17}H_{23}NO_3, AuCl_4H$, obtained in a similar way, from a hot solution, forms fine brilliant laminae, which retain their lustre in the air and melt at 159° . Will gives the melting point as 162° , while other chemists have found it to be from 158° to 160° .

The neutral oxalate $(C_{17}H_{23}NO_3)_2C_2O_4H_2$, obtained in the same way as the atropine salt, crystallizes as long stout prisms. The salt is anhydrous and melts at 176° . It dissolves in absolute alcohol rather more readily than the atropine salt, but also separates in granular masses.

(3) ATROPINUM NATURALE.—Under this name is understood, in commerce, the crystalline base obtained direct from belladonna root. The neutral sulphate made from this preparation is met with as Atropin. sulphur. purissimum, and most of the atropine sulphate of commerce consists of this article, which, according to the mode of preparation, contains sometimes the one and sometimes the other of the two previously-mentioned bases in preponderating amount.

For the purpose of comparison with the foregoing data the results obtained in the examination of four samples of the sulphate from different sources are given below. The salt is scarcely soluble in hot acetone, but readily soluble in hot absolute alcohol, from which it was thrown down, after cooling in crystalline masses consisting of minute needles. Analysis showed that its composition was the same as that of pure atropine sulphate. One sample was found to give for $[a]_D - 22^{\circ}3$ when $p = 2$ (anhydrous) and $t = 15^{\circ}$. The base prepared in the way already described crystallized in delicate needles and it melted at 109° . A solution of the base in absolute alcohol gave for $[a]_D - 16^{\circ}2$ when $p = 2.472$ and $t = 15^{\circ}$.

The neutral oxalate was prepared as above described, and mostly resembled

¹ *Annalen*, 206, p. 274.

² *Berichte*, 21, p. 1722.

³ *Ibid.*, 21, p. 2784.

the atropine salt. It was anhydrous and had the same composition as the previously-mentioned oxalates. When the water solution of the sulphate was mixed with platinum chloride and evaporated, an anhydrous platinum salt was obtained, which melted between 200° and 204° . But the gold salt melted at 154° to 158° , according to the sample of sulphate from which it was obtained. By recrystallization the melting-point could be somewhat raised, and crystalline salt was obtained from the mother liquors by evaporation, melting at 145° and even less.

It was evident that the four samples of sulphate consisted chiefly of hyoscyamine salt, though the actual amount could not be accurately determined as gold salt. This can, however, be done by the optical method. For that purpose the amount of water is to be first ascertained; so that a definite quantity of anhydrous salt can be operated upon. Representing the quantity of atropine salt in the unit of weight by x and that of the hyoscyamine salt by y , their respective rotatory power for solutions of equal strength by a and b and the rotatory power of the sulphate examined, by c , the amount of hyoscyamine salt will then be given by the formula $y = \frac{c-a}{b-a}$ and the amount of atropine salt by $x = 1 - \frac{c-a}{b-a}$. A control experiment, with known quantities of atropine and hyoscyamine sulphates, furnished indisputable evidence of the accuracy of this method.

The data given above suffice to show this mode of determining the two bases. For the same strength, solvent, and temperature it was found that $a = 8.8$, $b = 28.6$, and $c = 22.3$, *i. e.*, the rotary power of the mixed sulphate in question. Substituting these values in the formulæ, it is found that the hyoscyamine salt amounts to 0.682, and the atropine salt to 0.318. Consequently the salt consisted of 68.2 per cent. hyoscyamine sulphate and 31.8 per cent. atropine sulphate.

In a similar manner the relative amounts of atropine and hyoscyamine may be determined in the natural atropine or in other mixtures. Keeping to the above-mentioned strength of the alcoholic solution having the rotatory power $[\alpha]_D = -16.2$, the amount of hyoscyamine would be $y = \frac{20.3 - 0.4}{6.2 - 0.41} = 0.794$ and that of atropine $x = 1 - 0.794 = 0.206$.

The determination of the bases is of especial importance in the examination of plants yielding them. Schutte¹ attempted this with gold chloride, on the assumption that the hyoscyamine salt would be precipitated first and then the atropine salt. On the whole that is correct; but the former salt carries with it more or less atropine salt, from which it cannot be separated without considerable loss, while, on the other hand, some hyoscyamine remains in the solution and crystallizes with the atropine salt in a warty form. Moreover, the solution will contain amorphous substances, which sometimes render the detection of atropine difficult, if not impracticable. This may have been the reason why van Itallie² was unable to find more than traces of atropine in extract of belladonna.

On this account I have abandoned that method in determining atropine, and

¹ *Mittheilungen aus dem pharm.-chem. Institut der Universität Marburg*, xii, p. 596.
Chem. Centralbl., 1892, p. 390.

have adopted the plan of gradually adding an ether solution of oxalic acid to a solution of the bases in acetone, so long as the separation of crystals takes place. Under those conditions atropine oxalate separates first and afterwards hyoscyamine oxalate. From the several fractions the base is then separated as above described, and the nature of it determined by means of the melting point, and the behavior with gold chloride. By the aid of the optical method, which I was not then acquainted with, it would only be necessary to separate the mixed base from the deposited oxalate, and to ascertain the rotatory power of a known portion in alcoholic solution, in order to find whether the base consisted of atropine, hyoscyamine, or a mixture of both. In any case this method admits of a correct determination of the amount of atropine, while the gold chloride method gives a result that is much too low, as may be readily observed with "natural atropine" or its sulphate.

Whether the hyoscyamine salt in this sulphate may amount to 90 or only 10 per cent. and the atropine salt to 10 or 90 per cent., as is the case in the preparation recognized by the German Pharmacopœia, is of no importance in regard to the action of the salt, since in this respect there is no recognizable difference between the two salts. For that reason the requirement that the sulphate shall be prepared only from a base melting at $115^{\circ}\cdot5$ cannot be justified, because the base obtained, as it is furnished naturally, fulfils the same purpose, whether it consists of the one or the other or of a mixture of both.

4. HYOSCINE.—This base, alleged to be isomeric with atropine and hyoscyamine, was originally obtained by Ladenburg¹ from the so-called amorphous hyosycamine that was separated in the preparation of hyoscyamine from *Hyoscyamus niger*, and remained in the mother liquor. Subsequently Ladenburg² succeeded in preparing the hydrochloride, hydrobromide, and hydriodide of this base in the crystalline form, and hyoscine came into use as a medicinal agent. The preparation of hyoscine from *Hyoscyamus niger* was then undertaken by E. Merck, who had supplied Ladenburg with the material for his investigation. Up to within a recent period he supported the view that the composition of the base was represented by the formula $C_{17}H_{23}NO_3$, and he adopted the formula $C_8H_{15}NO$ given by Ladenburg as representing the composition of the pseudotropine obtained by the splitting up of hyoscine.³ This latter formula, however, is incorrect, and with it falls also the formula of hyoscine, which, as I shall show, is to be altered to $C_{17}H_{21}NO_4$, a formula which is in agreement with the results of numerous determinations made by Ladenburg himself.

For the material employed in my investigation I am indebted to Messrs. E. Merck. It consisted of hyoscine hydrobromide, which was quite pure. It had the form of large crystals, but the crystalline form could not be recognized. On dissolving in the least possible quantity of hot water it separated in fine crystals, the form of which agreed perfectly with the statement of Fock.⁴ The gold salt also presented all the characters described by Ladenburg as belonging to hyoscine aurochloride. When the identity of the base now known as hyoscine with that originally described under that name, had been

¹ *Annalen*, ccvi, 299.

² *Berichte*, xiv, 1870.

³ Merck's *Jahresber.*, January, 1892.

⁴ *Berichte*, xiv, p. 1872.

thus established, the further investigation was proceeded with for the purpose in view.

In preparing hyoscyne, the method already described was exactly followed. On evaporating the chloroform solution, the base could not be obtained in a crystalline state; it remained, at the normal temperature, as a hard, transparent, resinous mass which melted near 55° , forming a mobile liquid. Analysis of the base dried at 90° , until the weight became constant, gave results corresponding much more closely with the formula $C_{17}H_{21}NO_4$ than with $C_{17}H_{23}NO_3$, and proving that the composition of hyoscyne is properly represented by the former.

Hyoscyne is rather freely soluble in water and very soluble in ether, chloroform or alcohol. An alcohol solution has a strong basic reaction, and it gives for $[a]_D - 13^{\circ}7$ when $p = 2.65$ and $t = 15^{\circ}$. When the solution is mixed with a very small quantity of caustic soda its rotatory power is rapidly diminished.

This base may be precipitated from water solutions of its salts by caustic soda or ammonia; but a certain degree of concentration of the solution is necessary for that purpose. It forms with several acids crystallizable salts, most of which have already been prepared and examined by Ladenburg, but their composition has been represented by inappropriate formulæ.

Hyoscyne hydrochloride crystallizes, though with difficulty, when the water solution of the salt is evaporated. The solution does not give a precipitate with platinum chloride; but with gold chloride, on the contrary, even when tolerably dilute, it gives a crystalline precipitate. By cooling a hot solution of the gold salt it crystallizes in yellow needles, often grouped like those of ammonium chloride. The salt is anhydrous, and, as Ladenburg found, melts near 198° with decomposition. That melting-point is not the least altered, however many times the salt may be crystallized from water. Analysis of the salt gave results corresponding with the formula $C_{17}H_{21}NO_4 \cdot AuCl_4H$, and the majority of the results that were obtained by Ladenburg also agree with that formula; but not one of the gold determinations made by him agree with the formula $C_{17}H_{23}NO_3 \cdot AuCl_4H$.

Hyoscyne hydrobromide has the form of large rhombic crystals with a vitreous lustre; it is readily soluble in water, and contains water of crystallization that is completely separated by drying in the exsiccator at the normal temperature. The water solution $p = 4$ (not effloresced), and $t = 15^{\circ}$ gives for $[a]_D - 22^{\circ}5$. Analysis indicated that the composition of the air-dried salt is represented by the formula $C_{17}H_{21}NO_4 \cdot HBr + 3H_2O$, and that of the dehydrated salt by $C_{17}H_{21}NO_4 \cdot HBr$. Ladenburg, in order to bring the results of his analyses into agreement with the formula $C_{17}H_{23}NO_3$ for hyoscyne, assumed that the salt dried in the exsiccator, or even at 100° , still retained half a molecule of water. But his own hydrogen determination, for the salt dried at 100° , is evidence against that assumption. In the air-dried salt Ladenburg felt compelled to assume the presence of three and a half molecules of water of crystallization; but the results of his analyses do not agree with the formulæ assigned by him to either the dried or the hydrated salt.

Hyoscyne hydriodide is also obtainable in fine crystals; a water solution is lævorotatory. According to Ladenburg it also retains half a molecule of water when dried at 100° ; but according to my observation it is, in that condition,

anhydrous. Ladenburg's own determinations agree with that view, while the other formula would require a considerably larger amount of hydrogen than was actually found by analysis.

In regard to hyoscine picrate, Ladenburg complained that his analytical results did not agree well with the formula $C_{17}H_{23}NO_3, C_6H_3(NO)_3O$; but, on the other hand, they do agree well with the formula which I consider to be the correct one.

A further confirmation of the formula $C_{17}H_{21}NO_4$ is furnished by the composition of the products resulting from the splitting up of hyoscine by an alkali or by hydrochloric acid. Ladenburg held that, by the action of baryta, there were formed tropic acid and a volatile base, having a composition represented by the formula $C_8H_{15}NO$, to which he gave the name of pseudotropine; while on another occasion, together with Roth, he found the composition of the very same substance to be represented by the formula $C_8H_{15}NO_2$, and he then gave it the name of oxytropine. But in reality the composition of this base is represented by the formula $C_8H_{15}NO_2$; and since that formula does not admit of any direct relation to tropine being recognized, I propose to give the base in question the name of oscine, which is derived from hyoscine in a manner analogous to the derivation of the name tropine from atropine.

When hyosine hydrobromide is heated for some hours with concentrated hydrochloric acid in a sealed tube, to 80° or 100° , after cooling, an oily liquid settles to the bottom, which can be separated by shaking out the liquid with ether, while the oscine remains in the acid portion. On evaporating the ether solution the oily liquid remains, and after some length of time it becomes partially crystalline. It is almost entirely dissolved by petroleum spirit, and on evaporating the solution, a partially crystallizable oil is again obtained; the oily substance is also dissolved by lime water, and after addition of hydrochloric acid, it can be again obtained unaltered by shaking out with ether. By treating this mass with hot water, an acid was separated, which could be readily recognized as being atropic acid. The oily liquid, thus purified, continued to yield to hot water fresh quantities of atropic acid, which was readily seen to be produced by the treatment with water. On cooling it solidified, but a thin crystalline film was distinctly recognizable on the surface. Analysis gave results showing that the composition of this substance closely approximated to the formula $C_{18}H_{18}O_5$. Owing to undoubted retention of atropic acid, the amount of carbon was rather too high, and the hydrogen too low.

On a former occasion I met with the same substance in the splitting up of atropamine and belladonnine, just as it was previously obtained by Merling in the splitting up of belladonnine. No doubt this substance, which has the character of an acid, is intermediate between tropic acid, which Ladenburg obtained from hyoscine, and the tropide first obtained by Kraut,¹ and to which Liebermann and Limpach² gave the formula $C_{18}H_{16}O_4$. The name of tropidic acid would therefore be appropriate for this substance. The continuous formation of atropic acid, by heating with water, would be represented by the equation $C_{18}H_{18}O_5 = 2C_9H_8O_2 + H_2O$, while the formation of α -isatropic acid which has been previously observed to result from prolonged heating to

¹ *Annalen*, cxlviii, p. 241.

² *Berichte*, xxv, p. 937.

80° or 90°, would likewise be represented by the equation $C_{18}H_{18}O_5 = C_{18}H_{16}O_4 + H_2O$.

In regard to oscine, which is the basic product of the splitting up of hyoscyne, the acid solution of it was evaporated in a shallow capsule at a gentle heat, the residue dissolved in water, mixed with caustic soda, and shaken out with chloroform. On evaporating the chloroform solution, the oscine crystallized in rhombohedrons and short prisms. It was slightly hygroscopic and melted at 104°·5. Ladenburg found the melting point of the base 106°, the boiling point 240° to 242°. Merck found it 241° to 243°. However, oscine vaporizes when long heated to 100° in contact with air. Analysis of this base, dried for a long time at 60° in the exsiccator, gave results showing that its composition is represented by the formula $C_8H_{13}NO_2$.

Oscine dissolves readily in water, forming a strongly basic solution. It is not precipitated from its salts by ammonia, but it is separated by caustic soda as an oily liquid. With hydrochloric acid it forms a crystallizable salt. When the salt is mixed with a concentrated water solution of platinum chloride fine orange-red, apparently rhombic, prisms are formed, which can be readily recrystallized from boiling water. By evaporating the solution remaining more of the salt can be obtained. The salt contains water of crystallization, which is completely separated at 110°. The anhydrous salt then melts at 200° to 202° with decomposition. According to Merck it does not melt below 211° to 213°. Analysis gave results showing that the composition of the air-dry salt is represented by the formula $(C_8H_{13}NO_2)_2, PtCl_6H_2 + H_2O$, and that of the anhydrous salt by the formula $(C_8H_{13}NO_2)_2, PtCl_6H_2$, with which the analytical results, obtained by Merck, are in agreement. Further, the results obtained by Ladenburg and Roth¹ for the "oxytropine" salt and by Merling² for the same platinum salt, are also in accordance with these formulæ. Merling gives 4·9 and 4·96 per cent. for the amount of water, instead of 2·43 per cent.; but, probably, the salt analyzed was still moist, as he states that the crystals "effloresced on exposure to the air," though this cannot be observed with the carefully dried salt. It is, on the other hand, to me unaccountable that Ladenburg should have obtained for this salt analytical results corresponding closely with the formula $(C_8H_{15}NO)_2, PtCl_6H_2$.

For the corresponding oscine gold salt, the formula would be $C_8H_{13}NO_2, AuCl_4H$, but I have not analyzed it. I have, however, investigated the behavior of oscine with methyl iodide, statements regarding which have also been made by Ladenburg.

When oscine is brought together with methyl iodide, combination at once takes place with evolution of heat. It is advantageous to use a solution in methyl alcohol and to have a slight excess of methyl iodide. On evaporating the solution, after a short time, and recrystallizing the residue from water, the iodide is obtained in colorless rhombohedral crystals, which are anhydrous and readily soluble in water. Its composition is therefore represented by the formula $C_8H_{13}NO_2, CH_3I$, which agrees with the iodine determinations made by Ladenburg and Roth.³ They adopted the formula $C_8H_{15}NO, CH_3I$, errone-

¹ *Berichte*, vii, p. 153.

² *Ibid.*, xvii, p. 384.

³ *Ibid.*, xvii, p. 151.

ously calculating for that formula 42.19 per cent. iodine, though it really requires 44.87 per cent.

The chloride, obtained by agitating a water solution of the iodide with freshly precipitated silver chloride, remains, on evaporating the solution, as a white mass, consisting of prismatic crystals which are very readily soluble in water. By adding platinum chloride to the solution, the platinochloride is obtained as fine orange-colored, quadrangular, lustrous laminæ, which are anhydrous and melt near 228°. Ladenburg and Roth state that they obtained for this salt analytical results corresponding with the formula they have adopted; but I obtained results showing its formula to be $(C_8H_{13}NO_2, CH_3)_2, PtCl_6$.

BENZOYLOSCINE.—It was of interest to ascertain whether oscine contains, like tropine, a hydroxyl group, or whether the second atom of oxygen must be regarded as otherwise combined. For that purpose a mixture of the base with an equal weight of water and a considerable excess of benzoic anhydride, was heated to 80° or 100°. After the end of the reaction the remaining anhydride was decomposed with water, and the benzoic acid shaken out with ether. From the residual solution the base was separated by means of ammonia and chloroform. The chloroform solution gave on evaporation a colorless residue, which rapidly crystallized in the form of delicate needles melting at 59°. Analysis showed that the formula of the base, thus obtained, is $C_{15}H_{17}NO_4$, and that it corresponds to hyoscyne or atropylscine.

Benzyloscine dissolves readily in chloroform, ether, or alcohol, and the alcoholic solution has a basic reaction. It is also moderately soluble in water, very readily in acids; it is precipitated from such solutions by caustic soda, and when they are not too dilute, by ammonia, in the form of an oily liquid which soon becomes crystalline.

A warm solution of benzyloscine in dilute hydrochloric acid becomes turbid on addition of gold chloride, and the gold salt is soon deposited in the form of small, yellow, brilliant needles. After drying at 100° the salt melts at 184°. Analysis indicates its composition as $C_{18}H_{17}NO_4, AuCl_4H$.

[To be continued.]

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, October 18, 1892.

The first of the present series of pharmaceutical meetings was held this day. On motion of Professor Trimble Wm. B. Webb, Ph.M., was called to preside.

The reading of the minutes of the last meeting was dispensed with.

Dr. C. B. Lowe introduced Mr. Joseph R. Wilson, who exhibited and explained the *Shaw gas tester and Inspector's instrument*, manufactured in this city. It consists essentially of an air pump which thoroughly mixes gases of any kind and in any desired proportion. In testing gases they are transferred to a cylinder, and those which are dangerous owing to their explosive properties, on coming in contact with a flame explode and by forcing a loosely fitting piston against a gong give audible notice that the mixture is such as to be dangerous to those exposed to it. The instrument is claimed to be so delicate that the presence of $\frac{1}{10000}$ part of explosive gases can be detected, and the percentage of fire damp and choke damp may be accurately determined.

The uses which the instrument may be applied to are very many, but primarily its greatest value is that of detecting the character and consequently the safety of the atmosphere in coal mines and subterraneous diggings, where gases are liable to accumulate. For testing the character of the atmosphere in school-rooms, assembly halls and churches, its use is apparent and very valuable. It has also been used in testing the character of the air in oil tanks and in the coal bunks of ocean steamers, the accumulation of gas to an explosive point in such places being of most serious importance.

Mr. Wilson also described the effects of several gases upon animal life, and stated that sulphuretted hydrogen has been found the most noxious of any experimented with. It was further stated that the School Board in New York City employed the apparatus in testing the air of the school-rooms; that the Consolidated Gas Companies of New York City had adopted it in the analysis of gas they prepare for illuminating purposes, and that ere long it would probably form part of the outfit of those chemists who make gas analysis a special part of their work.

Mr. Webb said that the exhibition and explanation of the uses of the instrument were so interesting and instructive that the thanks of the College were due to Mr. Wilson, and on motion a vote of thanks was unanimously tendered to him.

Prof. Remington said that it was remarkable what a toleration of various gases is soon established by those working among them; that sulphurous acid gas, which is so irritating, soon becomes tolerable to some extent, and that workmen who prepare water of ammonia, and are consequently exposed to the vapor of ammonia, soon cease to be annoyed by it.

Professor Maisch exhibited a collection of *photographs* prepared by Fred. D. Maisch, photographer at Chicago. Among them were some landscape views with various interesting plants, like *Victoria regia*, species of *nymphaea*, *yucca*, *musa*, etc., and a large number of handsomely executed *microphotographs* of sections of authentic drugs, among them the barks of different species of *cinchona* and so-called false *cinchonas*; the roots of *senega*, *taraxacum*, *inula*, *apocynum*, *stillingia*, *cimicifuga*, *salep*, *colchicum*, *jalap* and *glycyrrhiza*; the wood of *quassia* and *picraena*; the fruit of *anise*, *conium*, *parsley*, *caraway*, *fennel* and *juniper*; the seed of *stramonium* and *cardamom*, and many others. These photographs are very instructive for the study of the characteristic structure of drugs.

Prof. Maisch read a note from Mr. C. E. Hires in regard to the asserted parasitic character of the *vanilla plant*; also abstracts from the works of several English, French and German botanists clearly proving the plant to be epiphytic, but not parasitic. (See p. 554.)

Dr. Lowe exhibited an *apparatus for preparing syrup* for pharmaceutic uses and especially useful where large quantities of syrup are consumed at the soda-water fountain. It consists of a can with a false bottom of tinned wire supported above the middle of the can; upon this is placed a layer of cotton cloth; a small pipe is soldered to one side of the can to permit the passage of air from below the diaphragm to the upper part of the can; the sugar is put upon the strainer, water is added and the syrup percolates to the lower part of the vessel; it has proved to be of great utility during the past year that it has been in use.

Professor Remington called the attention of the meeting to a process for preparing *soap liniment* extemporaneously; he stated that the process of the pharmacopœia as frequently carried out does not yield satisfactory results; this is not because the formula is at fault, but because the method of procedure does not carry out the directions. Soap shavings recently prepared contain from 16 to 25 per cent. of moisture; but if in place thereof dried soap be used without making allowance for this water, the liniment will contain more soap than is intended by the pharmacopœial formula; hence, a portion of this excess is separated in cool weather. The formula offered was suggested by Mr. Geo. W. Sloan, of Indianapolis; it is as follows: Dissolve 2.5 parts of oil of rosemary in 187.5 parts of alcohol; then 11.2 parts of camphor is to be added and shaken till dissolved; into the mixture pour 17.5 parts of *powdered soap* and shake all together; then add water sufficient to make 250 parts. All soaps contain some trifling amount of impurity that is insoluble; after standing twelve hours the tincture should be filtered and it will remain permanent for an indefinite length of time.

Mr. Beringer read a paper upon *Ehrlich's test for typhoid urine*; he showed by a number of experiments that certain chemical compounds gave similar reactions.

Prof. Maisch said that in view of these results, great caution was necessary to avoid hasty conclusions, and that the paper was, therefore, a very valuable contribution. The papers were, on motion, referred to the publication committee.

A question was raised about the advisability of changing the hour for meeting, and upon discussion it was concluded that this had better be left to the judgment of the committee. There being no further business, a motion to adjourn was made and carried.

T. S. WIEGAND, *Registrar*.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Galerie hervorragender Therapeutiker und Pharmacognosten.—Galerie d'éminents thérapeutistes et pharmacognostes. Par B. Reber, pharmacien, Genève.

Gallery of prominent therapeutists and pharmacognosts.

Under the title given above in German and French, there is being published a biographical work, containing in addition also handsomely executed phototypes of men who have attained prominence in the sciences of therapeutics and pharmacognosy. Mr. Reber, the author and publisher of the work, is a pharmacist in Geneva, Switzerland, and well known as a writer on pharmaceutical subjects, and as editor of the periodical "*Fortschritt; Le Progrès*," which was published in Geneva in the German and French languages. A few of the biographies contained in the parts now before us appeared previously in the periodical named. The work is issued in parts containing five portraits and the necessary text in quarto. The three numbers thus far issued contain the biographies with pictures of the following scientists: Daniel Hanbury, F. A. Flückiger (now of Bern), H. H. J. Hager (Frankfurt a. d. O.), A. E. Vogl (Vienna), Geo. Dragendorff (Dorpat), E. Heckel (Marseille), F. Schlag-

denhauffen (Nancy), J. Trapp (St. Petersburg), C. Binz (Bonn), R. Bentley (London), E. Schaer (now at Strassburg), W. O. A. Tschirch (Bern), Arthur Meyer (Marburg), T. F. Hanausek (Vienna), and J. Attfield (London). As will be observed all these scientists are living, with the exception of Hanbury, whose biography, in connection with that of Flückiger, has been very appropriately selected by the publisher for the opening pages of this "gallery." The work contains much information, otherwise not attainable, or only with much difficulty; it is written in a plain matter-of-fact manner, but pays deserved tribute to such men like Hanbury, and as a collection of biographical information ranks as a very valuable contribution to the history of progress in medicine and pharmacy during the present century. As such it deserves a place in every comprehensive medical and pharmaceutical library, the more so since the publishing price is extremely low, being only 2.50 francs per number.

Sur deux Plantes alimentaires coloniales peu connues. Par MM. Édouard Heckel et Fr. Schlagdenhauffen. 8vo. Pp. 27.

Résistance des Animaux à l'action de certains poisons. Par M. le Dr. E. Heckel. Pp. 4.

Two reprints from "Revue des Sciences naturelles appliquées," of which the former treats of the natural history, chemical composition and physiological action of two little known alimentary plants, more particularly about the tubers of *Dioscorea bulbifera*, Linné, and *Tacca pinnatifida*, Forster. It is of particular interest to note the fact that the aerial axillary tubers of the first-named plant contain a toxic principle, which is not present in its subterranean tuber. The second pamphlet is a brief report on the resistance of animals to certain poisons, especially atropine.

Modern Materia Medica for Pharmacists, Medical Men and Students. By H. Helbing, F.C.S. Third enlarged edition. New York. Lehn & Fink. London: The British and Colonial Druggist. 1892. 8vo. Pp. 202.

A year ago we commented on the second edition of this work, which had then made its appearance. That a new edition has become necessary in so short a time is of itself proof that the work has been found useful. In examining its pages we find that new chapters have been introduced, among others, on bromol, euophene, gallacetophenon, pental, salicylamide, dithio-salicylic acid, sulphaminol and thiol; and that a much larger number of claimants for medical recognition have been added under other headings, as derivatives, or allied compounds. The appendix, which contains mostly proximate principles, and their compounds, has likewise been enlarged; the divisions on the medicinal uses have been rewritten to a considerable extent, and the chemical researches, up to the time of publication, have been incorporated. It is a comprehensive, well arranged little volume, suitable for ready reference, and for reliable information on mostly "new" and "synthetical" remedies, and as such will be found very useful to the physician and pharmacist. The very complete index, containing also the synonyms of the compounds, will be appreciated by those consulting the book.

A Text-book of Chemistry; intended for the use of Pharmaceutical and Medical Students. By Samuel P. Sadtler, Ph.D., F.C.S., and Henry Trimble,

Ph.M., Professors in the Philadelphia College of Pharmacy. Parts I and II. Elementary Physics and Chemistry of the Non-Metals. Philadelphia: P. Blakiston, Son & Co., 1892. 8vo. Pp. 209.

This is a preliminary issue, not intended for general circulation, but rather for the uses of the present classes of the College, in which both authors have been active as teachers for a series of years. Part I treats of elementary physics in chapters devoted to matter, force and motion, special properties of matter (such as attraction, repulsion, pressure), heat, light, magnetism and electricity. In Part II the non-metallic elements are considered in six chapters, comprising hydrogen, the halogens (chlorine, bromine, iodine and fluorine), the oxygen group (oxygen, sulphur, selenium and tellurium), the nitrogen group (nitrogen and phosphorus), boron, and the carbon group (silicon and carbon). The definitions, descriptions of apparatus and experiments or processes, explanations of properties and applications, etc., are simple and clear, whether merely outlined or given more in detail. While nothing is omitted that may serve to illustrate the important principles and theories of chemical science, due prominence, without unnecessary prolixity, is given to such facts which have a bearing upon application in medicine and pharmacy. More than fifty well-executed cuts serve to still further elucidate apparatus, experiments and technical processes.

The work now before us is to form part of a full text-book and reference book on chemistry for students in pharmacy and medicine, and the authors will at an early date complete the entire work, which beside the above, will include the chemistry of the metals and metallic salt, the chemistry of the carbon compounds (organic chemistry), and the outlines of analytical chemistry, including the subject of drug-assaying. If continued, as will doubtless be the case, in the same excellent manner as the parts now before us, the work will form a very comprehensive, practical and valuable book for students, as well as for reference by others interested in medical and pharmaceutical chemistry.

1,500 Prescriptions of all kinds, right and wrong, selected from prescription files, journals, formularies, pharmacopœias and medical works, illustrating correct and incorrect construction, latinity, abbreviations, doses and pharmacy, and covering all the principal forms in which medicines are commonly administered. Intended as an aid to pharmaceutical teachers, students and examiners. By Oscar Oldberg, Ph.D., Professor of Pharmacy, Northwestern University. Published by the Apothecaries' Company, Chicago. 1892. Pp. 244. Price, \$1.50; interleaved \$2.00.

The title page explains the aim and scope of the work, which is divided into eleven parts, of which one contains prescriptions in unabridged Latin, intended to be translated into English, and to be rewritten in the customary abbreviated form. The second part illustrates problems of prescription writing; and the third and fourth parts contain prescriptions in which the quantities are to be calculated into metric terms or into the old-fashioned apothecaries' weights and measures. The remaining parts give prescriptions, of which a large number are subject to criticism for various reasons, while others present difficulties to be overcome. The prescriptions are of so varied a nature that nearly all phases, good and bad, are encountered, and furnish excellent material for comprehensive study and manipulation, leaving nothing to be desired for exercises in the direction indicated; the chirography of some prescribers

—which leads to studies of a different nature—cannot be reproduced by ordinary types.

Diseases of the Lungs, Heart and Kidneys. By N. S. Davis, Jr., A.M., M.D., Professor of Principles and Practice of Medicine, Chicago Medical College, etc. Philadelphia: The F. A. Davis Company. 1892. 12mo. Pp. 359. Extra cloth, \$1.25.

This neat volume constitutes No. 14 in the Physicians' and Students' ready-reference series, and has been elaborated by the author from his notes on lectures delivered by him in the Chicago Medical College. The diseases of the organs named are grouped together as follows: Section I, Diseases of the bronchi, of the lungs and of the pleura; Sect. II, diseases of the pericardium, of the heart muscle, of the endocardium and of cardiac innervation; Sect. III, functional inactivity of the kidneys, diseases of renal circulation, renal inflammations, renal degeneration and disorders of the renal pelvis. The nature, causes, symptoms, anatomical changes and manner of treatment are concisely, and at the same time clearly and fully set forth, and particular attention has been given to the treatment, for which explicit directions are given in regard to the drugs, serviceable at particular stages of the disease, and their mode of action. The book appears to be thoroughly practical, and, therefore, eminently useful for both physicians and students of medicine.

Recherches sur le développement du fruit et l'origine de la pulpe de la Cassie et du Tamarin. Par Gustave C. E. Tremeau. Lons-le Saunier. 1892. 4°. Pp. 31.

Researches on the development of the fruit and the origin of the pulp of cassia fistula and of tamarind.

A thesis from the Paris School of Pharmacy, containing, in addition to the text, nine large plates of drawings under the microscope illustrating the author's observations.

OBITUARY.

Carl Schorlemmer, LL.D., F. R. S., Professor of Chemistry to Owens College, Victoria University, Manchester, England, died there June 27, 1892. He was born in Darmstadt, September 30, 1834, in which city he was educated, studying subsequently in Giessen. In 1858 he was chosen by Professor Roscoe, of Owens College, as his assistant, and a few years later he became a professor in the same institution, a position which he held until the time of his death. In 1862 his famous investigations on the hydrocarbons of the formula $C_n H_{2n+2}$ in the light oils of cannel coal tar were published, which were followed by others on boghead coal, petroleum, etc., and paved the way for the sound foundation upon which organic chemistry has since been laid. Schorlemmer's name is widely known as the author of text-books on the chemistry of the carbon compounds, and as the co-author, with Roscoe, of their great "Treatise on Chemistry," published simultaneously in England and in Germany. For some time before his death he had been engaged upon a history of chemistry, which, Professor Roscoe states, extends to the end of the eighteenth century, and though not completed, its speedy publication is looked to with great interest.

THE AMERICAN JOURNAL OF PHARMACY.

DECEMBER, 1892.

ON THE MEDICAL USES OF COMPRESSED GASES.

BY CLEMENT B. LOWE, PH.G., M.D.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Nov. 15.

Within a comparatively recent period there has been introduced to the notice of the medical profession the use of compressed gases, the principal ones now being used in this way being oxygen and nitrogen monoxide (formerly known as nitrous oxide, or laughing gas).

The medicinal properties of both of these gases have been known for many years. Experiments made upon animals have shown that the inhalation of oxygen produces no injurious effects, but the reverse; they gain in body-weight through the stimulating effects upon the nutritive functions, these results being produced mainly by the effects of oxygen upon the blood through the increase and stimulation of the red corpuscles. The effects thus produced upon animals have been verified by numerous cases reported by physicians of prominence. The chief diseases in which it is indicated are diseases of the respiratory organs, characterized by difficulty in breathing, such as asthma, croup, etc., also in the early stages of phthisis pulmonalis; in chronic indigestion, and especially in asphyxia from poisonous gases, such as carbon monoxide, etc. In the latter case its use may be invaluable; for instance, a person has been found insensible from the inhalation of carbon monoxide produced by imperfect combustion in a stove in a bed chamber. If the carbon monoxide has not been present in sufficient amount to saturate all of the hæmoglobin of the red corpuscles of the blood, recovery takes place, *but very slowly*, it being weeks or months before the patient is restored to normal health. In such a case the

inhalation of oxygen would be of the greatest value, the hæmoglobin being at once changed to oxyhæmoglobin and the blood in the arteries being restored to its bright scarlet color.

The anæsthetic properties of nitrogen monoxide were discovered by Sir Humphrey Davy. It was first used in dentistry by Dr. Wells, of Hartford, Ct., and more recently as a remedial agent by some of the most eminent physicians of the country, Dr. J. E. Blake, and A. McLane Hamilton being prominent among them. It is also being extensively used by medical quacks under the name of compound oxygen. It should be stated that in many cases the latter gas has given better results than those from oxygen. It is stated that one of the best known of New York City physicians has used more than 20,000 gallons of nitrogen monoxide in his practice during the past two years, chiefly in the treatment of nervous diseases. He regards it as a sheet anchor in nervous prostration, insomnia, melancholia, etc.

While, as before stated, the use of these gases therapeutically is not new, the use of them in a compressed form is more recent, as previous to the use of the apparatus devised by the S. S. White Dental Mfg. Co., of this city, which, through their courtesy, I shall have the pleasure of showing you this afternoon, oxygen had to be made by the physician himself, necessitating the use of expensive apparatus, and the loss of valuable time. Even if procured from those who manufacture it for calcium lighting (with but one exception in this city), it would taste of illuminating gas (carburetted hydrogen) on account of the same pump being used to compress both gases.

As the use of these compressed gases shall become more frequent by the medical profession, pharmacists can add to their stock these cylinders, and be ready to supply them at a moment's notice as they would any other remedy, as is already done by a member of our college.

In using the apparatus the compressed gas is first conducted into a rubber bag or a metallic gas receiver, from the former of which it is inhaled under ordinary pressure, the gas passing through a bottle partly filled with water. If to be used as an enema, the gas is displaced from the receiver by water flowing from a can placed about 22 inches above the receiver, and is passed through a bottle, containing warm water, to the patient.

Nitrogen monoxide is used in the same way for inhalation, but when used as an anæsthetic of course the face piece as used by dentists should be employed.

LIATRIS SPICATA.

BY WILLIAM F. HENRY, PH. G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

No. 117.

This plant is an indigenous perennial, growing in meadows and other moist grounds throughout the Middle and Southern States. The rhizome is a half inch or more in diameter, slightly wrinkled, of a brown color, externally and internally of a dingy white with streaks of brown. Its odor is somewhat balsamic and its taste warm and bitterish.

A proximate analysis of this rhizome yielded 8.13 per cent. of moisture and 5.35 per cent. of ash.

Petroleum ether extracted from the finely powdered drug 2.80 per cent. This extract consisted of volatile oil 0.09 per cent., fat 0.54 per cent., wax 0.70 per cent., and a substance resembling caoutchouc 1.48 per cent. This substance was insoluble in hot absolute alcohol, but dissolved in chloroform. It was amorphous and of a light-yellow color, which became dark-brown on the addition of concentrated sulphuric acid. Nitric acid produced no change of color, but sulphuric acid and potassium bichromate caused first a dark-brown and then an olive-green color.

The residual drug yielded 3.15 per cent. to stronger ether. This extract consisted mainly of resin, with the exception of 0.88 per cent. of the same caoutchouc-like body that was extracted by petroleum ether. Absolute alcohol extracted from the remaining drug 2.29 per cent. This consisted of resin with some coloring matter. Tests for alkaloids and glucosides were applied to this as well as to the ethereal extract of the drug with negative results.

After the action of the previous solvents, water removed 26.53 per cent. of the drug. Of this 6.03 per cent. were mucilage, 8.65 per cent. glucose, 5.98 per cent. saccharose, and 2.65 per cent. dextrin. The character of the remaining portion dissolved by water was not determined. To other solvents the remainder of the drug yielded 4.86 per cent. of albuminoids, and 16.00 per cent. of inulin.

The conclusions reached by this analysis were that the drug does not possess any compounds of sufficient importance to warrant a belief in its medicinal activity.

ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

Formic aldehyde, according to Berlioz and Trillat (*Compt. rend.*, cxv, 290), is a powerful antiseptic, arresting in very small proportion the development of bacteria, and preventing the putrefaction of animal substances, the gas being rapidly diffused through the tissues. On the other hand, the authors state that the inhalation of the vapor, even when continued for some hours, has no poisonous effect.

Preparation of carvacrol.—A. Reychler obtained (*Bull. Soc. Chim.*, 3 sér., vij, 31) 90 parts of carvacrol from 100 parts of carvol hydrochloride, by heating it with 2 p. anhydrous zinc chloride in the presence of glacial acetic acid, 33 p., whereby the violent reaction is moderated; HCl is evolved, the heat is finally raised to about 120°, most of the acetic acid is then distilled off, the residue washed with water, then distilled and the distillate washed with diluted alkali. Anhydrous carvacrol dissolved in absolute alcohol is not affected by ferric chloride, but if a trace of water be added the solution acquires a green color.

Preparation of pyrogallol.—A mixture of gallic acid, 1 p., and aniline, 2 p., solidifies in a short time. P. Cazeneuve (*Compt. rend.*, cxiv, 1485) heats this mass to 120° C. until CO₂ ceases to be given off, when on cooling aniline pyrogallate will crystallize in long needles; on treating these with benzol or toluol, aniline is dissolved and pure pyrogallic acid remains behind; the melting point of the latter is 132°, not 115°, as is usually stated.

Galactagogue remedies.—From observations made by Miss Griniewitch (Thesis, in *Bull. gén. de Thérap.*, August 30, 1892) it was demonstrated that the herb of *Galega officinalis* (goat's rue), the nettle, cumin, anise and fennel are reliable galactagogues, their activity being in the order named. No undesirable effect was observed from these remedies, either upon the women, while taking the medicine, nor the children whom they nursed. The milk was normal in density, a slight increase of fat being noticed. The herbs

may be given in the form of extract, while anise and the other fruits may be taken in powder in doses of 1 gm., from twice to five times a day.

Elimination of strontium bromide.—Dr. Féré reported to the Biological Society, at the June meeting, that this salt is rapidly and completely eliminated by the urine, and though this elimination begins later, there is less accumulation of this salt in the system than of potassium bromide. See also Amer. Jour. Phar., 1892, p. 136.

Effects and uses of strontium salts.—In an essay upon the physiological effects and therapeutic uses of these salts (abstract in *Revue internat. de Bibliogr. méd.*, October 10, 1892, p. 330), Dr. Armand Malbec, of Paris, states the adult dose of the *lactate* to be from 2 to 10 gm., while the *bromide* and *iodide* may be given in the same doses as the corresponding potassium salts; the *sulphate* and *phosphate* being insoluble may be given in wafers, or mixed with food, or preferably in the form of biscuits. The author finds the salts to be non-poisonous; they appear to facilitate the nutritive acts in the organism, more particularly the *lactate*; to sensibly augment the intravascular tension on the one hand, and on the other hand to retard the peptonization of the albuminoids, thus effecting a favorable action in certain pathological conditions.

The author regards the *lactate* as being indicated in certain forms of albuminuria and also in gastric affections, characterized by hyperpepsia with accompanying pain; it may even advantageously replace the alkali bicarbonates. *Bromide of strontium* is a substitute for potassium bromide, is better tolerated by the stomach and does not cause the condition of bromism. *Strontium iodide* should be preferred to potassium iodide as a cardiac and circulatory medication, in case the latter be not well tolerated.

Strontium nitrate is a good diuretic. *Strontium sulphate* and *phosphate*, notably the latter, may be utilized as antiseptics, antiparasitics and restoratives.

Strontium phosphates.—L. Barthe has prepared the following (*Compt. rend.*, cxiv, 1267):

On adding a cold ammoniacal solution of sodium phosphate, 90 parts, to ammoniacal solution of strontium chloride, 100 p., amorphous

normal strontium phosphate, having a bluish tinge, is precipitated; dried at 100° C. it is anhydrous.

On using acidulated solutions of strontium chloride, 70 p., and sodium phosphate, 100 p., at a temperature not exceeding 50° C., a gelatinous precipitate of *distrontium hydrogen phosphate* is produced, gradually becoming granular, and by the heat of the blow-pipe is converted into bluish *pyrophosphate*. Its solution in cold phosphoric acid concentrated below 50° C., yields tabular crystals of $2\text{SrO}, \text{H}_2\text{O}, 3\text{P}_2\text{O}_5 + 7\text{H}_2\text{O}$, which are soluble in water.

Equal volumes of decinormal solutions of phosphoric acid and strontium oxide yield a precipitate having the composition $\text{SrH}_4(\text{PO}_4)_2 + 2\text{H}_2\text{O}$.

Barium chloride, according to Dr. Lelli, exerts a harmful influence upon certain forms of scrofula; but the gastritis of scrofulous children is generally modified after a few days, the diarrhoea diminishes, and a cure is effected in from two to four weeks; at first, the remedy has an irritating effect upon the mucous membrane of the intestines. The author prescribed the salt to children, according to their age, in doses of 0.03 to 0.20 gm., to be taken after a meal.—*La Médecine moderne*.

Arsenic cyanide, AsCy_3 , has been prepared by E. Guenez (*Comp. rend.*, cxiv, 1186), from powdered arsenic and excess of dry cyanogen iodide in the presence of carbon bisulphide, the mixture being finally heated on a water-bath, and the minute yellowish crystals freed from arsenic iodide by washing with carbon bisulphide. Arsenic cyanide is rapidly decomposed by moisture into arsenious and hydrocyanic acids; on heating a portion of the cyanogen is given off, paracyanogen and arsenic remaining behind. Iodine converts the compound into arsenic iodide and cyanogen iodide, and the mixture with potassium chlorate is violently explosive.

Cholesterin, prepared from phanerogamous plants, according to Gérard (*Compt. rend.*, cxiv, 1544), agrees in its properties with Hesse's phytosterin, melts at 132° C., and after complete drying at 135° , the rotatory power being at the same time increased from -34.4° to -36.5° . It is obtained by preparing an extract with ether, saponifying it with alcoholic potassa, exhausting the dried soap with ether and evaporating; the acicular crystals are again treated with potassa, and the alkaline watery solution agitated with chloroform. The crystallized

cholesterin may be still further purified by converting it into the benzoate, crystallizing repeatedly from alcohol and saponifying.

Prepared from cryptogamous plants by a similar process, cholesterin gives the reactions of Tanret's ergosterin, but the melting point and the rotatory power differ to some extent.

The physiological action of cinchonamine has been studied by Dr. Chauin. In a report to the Biological Society the author stated (*La Tribune médicale*) that this alkaloid has a toxic action upon animals and effects a considerable reduction of temperature in animals which had been rendered feverish by inoculation, or by the administration of chemical compounds.

Recognition of nickel in presence of cobalt.—L. Lafay (*Journ. de Pharm. et de Chim.*, 1892, 24, p. 67) publishes a method for the recognition of these metals which is based on the following reaction: Prepare a 5 per cent. solution of chloride of cobalt and add an equal volume of a concentrated solution of potassium bichromate and a large excess of ammonia; on adding to 4 or 5 cc. of this solution a large excess of solution of potassium hydrate, a precipitate is formed which redissolves in the liquid forming a greenish and limpid solution. A salt of nickel treated in like manner yields a precipitate which does not redissolve. In case of a mixture of the salts potassa yields a precipitate from which the cobalt is extracted by a large excess of the precipitant.

Dermatol in purulent otorrhœa.—Dr. Chaniavsky (*Med. Obozr.*, through *Nouv. Remèdes*, 1892, 408) treats purulent otorrhœa in the following manner: The ear is washed with an aqueous solution of boric acid, and then some absorbent cotton on which dermatol is placed is inserted.

A new antiseptic mixture.—Dr. Cavazzini (*Rif. Med.* through *Nouv. Remèdes*, 1892, 436) recommends for dressings the following antiseptic powder: Iodoform 55 parts, salicylic acid and bismuth subnitrate each 20 parts, camphor 5 parts. The powder is of a yellow color and free from disagreeable odor. Torpid and fungoid granulations are favorably influenced and suppuration is greatly diminished.

Treatment of croup.—Dr. Bonain (*Rev. laryng., otolog. et rhinolog.*, Aug., 1892) advises the following treatment of cases of croup: (1) Potion: lactic acid, 3 gm.; syrup of tolu, 50 gm.; water, 100 gm.

Dose—half a teaspoonful every hour. (2) Inhalations of a coffee-spoonful of the following mixture every two hours: carbolic acid, 1 gm.; alcohol (90 per cent.), chloroform, each 10 gm. (3) Injections with a Pravaz syringe morning and evening into one of the infra-spinous fossa: oil of turpentine, 2 gm.; paraffin oil, 10 gm.

Digestive ferment in Anagallis arvensis.—Daccamo and Tommasi (*Rev. Thérap.*, 1892, 470) found a digestive ferment in *anagallis arvensis* by reducing the fresh plant to a pulp and keeping in contact with fresh meat and fibrin. At the end of thirty-six hours the fibres were completely separated. The authors obtained the ferment in the form of a white, amorphous mass, which is readily soluble in water, and has no action on starch.

Hypodermic injections of digitalis in treatment of cardiac affections.—In a number of cases of cardiac affection which rebelled against every treatment, and in which digitalis, given by the mouth, was ineffectual, Dr. K. Zienitz (*Med. Obozr.*, 1892, 37, p. 922, through *Nouv. Remèdes*, 1892, 419) had recourse to hypodermic injections of digitalis. He used an infusion of digitalis (0.3 to 10 gm.), of which he injected two syringefuls twice a day.

Preparation of cantharidin.—Debuehy (*Four. de Pharm. et de Chim.*, 1892, 24, p. 13) advises the use of methyl-formic ether in place of acetic ether, chloroform, etc., for extracting the cantharides, and petroleum ether for washing the impure cantharidin in place of carbon bisulphide.

GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

Thiosinamine^c or allyl sulphocarbamide, $\text{CS NH}_2 \text{NHC}_3\text{H}_5$, a compound known for many years, has been used very successfully during a two years' trial by Dr. v. Hebra in the treatment of lupus, and has also been found to exert a powerful and favorable action in reducing glandular tumors. Thiosinamine is made from volatile oil of mustard (allylisulphocyanate), by treatment with ammonia. The crystals have a bitter taste and a faint odor resembling oil of mustard, and are easily soluble in hot water, alcohol and ether. Injections of a 15 per cent. (alcoholic) solution form the method of using; immediately after the injection a burning pain is felt, which, however, is of short duration.—*Oesterr. Ztschr. f. Pharm.*, 1892, 695.

Estimation of quinine in cinchona barks.—20 grams of the finely

powdered, air-dried bark are macerated, with frequent agitation, for 24 hours with a mixture of 10 cc. water of ammonia (sp. gr. 0.960), 20 cc. alcohol (90 per cent.) and 170 cc. ether; 100 cc. of the clear liquid are then transferred to a beaker, 27 cc. water and 3-4 cc. normal hydrochloric acid solution added and set aside for 24 hours to allow the ether to evaporate; by placing the beaker in a water-bath the alcohol and ammonia are next dissipated, adding, if necessary, sufficient hydrochloric acid to assure a neutral or faintly acid solution (should too much acid be added the excess is neutralized by the addition of *cinchonine*, thus preventing the introduction of ammonia or fixed alkaline hydrates). The liquid at this stage should measure about 15 cc. (greater concentration in presence of free acid frequently causes decomposition); after cooling a red-brown coloring matter generally separates, which is filtered out, and in the filtrate is then dissolved 2-3 grams Rochelle salt, the solution heated upon a water-bath for fifteen minutes and set aside for 24 hours. After filtering off the insoluble tartrates of quinine and cinchonidine (the filtrate is proven to be free from these alkaloids by warming with a little additional Rochelle salt), the tartrates are washed with as little water as possible and then drained; for each cc. of original filtrate an allowance of 0.0008 gm. quinine, and for each cc. of washings an allowance of 0.0004 gm. quinine must be made. The tartrates are dissolved in water, using the smallest possible quantity of hydrochloric acid; this solution is thoroughly extracted with ether to remove soluble substances, and made alkaline with sodium hydrate and now the alkaloids (quinine and cinchonidine) extracted by agitation with ether; this ethereal solution is evaporated and the residue dried at 100-110° C. and weighed. By treating this alkaloidal residue with a saturated solution of cinchonidine in ether, the quinine is dissolved; after decanting the solution, the residue is quickly washed with a few cc. of pure ether, and dried at 100-110° C. to constant weight. To the difference between the two weighings must be added the correction for the solubility of the tartrate of quinine and the sum represents the quinine in 10 gm. of the bark. The quinine in the ethereal solution can be converted into tartrate, which will be beautifully white and suitable for polarization or for de Vry's method of estimation.—J. H. Schmidt (apothecary in Soerabaya), *Pharm. Centralhalle*, 1892, 594.

Iosophan or *tri-iodo-meta-cresol* is prepared by the action of iodine upon *m*-oxytoluic acid in the presence of the calculated quantity of alkaline hydrate or carbonate; the carboxyl group, present in the acid, suffers oxidation to carbonic oxide and the new compound, $C_6HI_3.CH_3.OH$, results. It appears in the form of white needles, melting at $121.5^{\circ} C.$; it is difficultly soluble in alcohol, but readily soluble in ether, chloroform, benzol and at a temperature of $60^{\circ} C.$ also in fixed oils; dilute sodium hydrate solution dissolves it, but a concentrated solution changes the *Iosophan* into a greenish-black, amorphous body. The preparation contains about 80 per cent, iodine and upon ignition yields copious iodine vapors. Solutions in dilute alcohol (50 per cent.) are subject to decomposition, but a solution in 75 per cent. alcohol remains unchanged for considerable periods. Saalfeld has used a one per cent. alcoholic solution or a 2-3 per cent. ointment (containing petrolatum or a mixture of lanolin 80 per cent. and petrolatum 20 per cent. as the base) with success in skin diseases (*Herpes tonsurans*, *Pityriasis versicolor*, etc.).—(*Therap. Monatsh.*) *Pharm. Centralhalle*, 1892, 613.

Cocaine cantharidate,⁴ made according to directions of Hennig (by union of 2 molecules cocaine hydrochlorate with 1 molecule cantharidin dissolved in 2 molecules NaOH), is not a chemical compound, but merely a mixture from which the sodium chloride, however, is removed by an unpublished process; it is claimed to have notable therapeutic advantages over the cantharidates in the treatment of pulmonary tuberculosis and chronic catarrhal affections of the air passages. The remedy presents an amorphous, white, odorless powder of unpleasant, pungent taste; it is soluble in boiling water and insoluble in alcohol, ether and benzin. Because of greater stability the following solution is recommended for subcutaneous injections: cocaine cantharidate 0.075-0.15 dissolved in chloroform water 50.0; the dose representing $\frac{1}{10}$ milligram cantharidin.—(*Berl. Klin. Wochenschr.*) *Apotheker Ztg.*, 1892, 522.

Tetrathiodichlordisalicyclic acid ($C_6HCl(OH)CO.OH)_2S_4$ made by slowly heating 27.6 salicylic acid with 55.0 sulphur chloride to $120^{\circ} C.$ and later to $140^{\circ} C.$, is stated to have antiseptic properties; it softens at $150^{\circ} C.$ and at $160^{\circ} C.$ is completely melted.—*Pharm. Centralhalle*, 1892, 648.

A chlorine derivative of antipyrine,^c to be used therapeutically, according to a patent application, is made by acting upon antipyrine with hydrochloric acid and bleaching powder. It has the formula $C_{11}H_{12}H_2O_3Cl_2$, is insoluble in water, dilute acid, ether, chloroform and ligroin, but soluble in hot alcohol and glacial acetic acid; in alkalis it is soluble with decomposition; heated to 228° C. it melts, charring and giving off hydrochloric acid vapors. By heating in a current of chlorine, or passing chlorine through the acetic acid solution and by heating with hydrochloric acid or alcohol to 150° C. it is converted into dichlor-methyl-phenyl-pyrazolon which then can be easily reduced to methyl-phenyl-pyrazolon.—*Apotheker Ztg.*, 1892, 532.

Constituents of Lolium temulentum, L.^d—An analysis of the seeds of this plant by Hofmeister corrects the results announced by Dr. P. Antze (*Am. Jour. Pharm.*, 1891, 568). The volatile alkaloid "*loliine*" was found to be impure ammonia; the so-called "*temulentine*" was also found to be a mixture containing some of the narcotic principle which Hofmeister isolated and called *temuline*; "*temulentinic acid*" is at present considered by Hofmeister to be a mixture of the acid tartrates of ammonium and potassium. Hofmeister's *temuline* is not crystallizable, is very likely a pyridine derivative, is soluble in water, has an alkaline reaction and eagerly absorbs carbonic oxide. The crystallized hydrochlorate has the formula $C_7H_{12}N_2O \cdot 2HCl$. The amount of temuline present in the seeds is approximately 0.06 per cent. The author also determined the presence of an acid containing nitrogen, and of an uncrystallizable alkaloidal body; by decomposing the platinum double salt of the latter, a mixture of temuline hydrochlorate and an uncrystallizable syrupy body were obtained. Physiological experiments established that temuline is a peculiar nerve poison causing stupor and paralytic weakness.—(*Arch. f. exp. Path.*) *Apotheker Ztg.*, 1892, 544.

Dulcine is a product which, because of its intense sweetness and its non-poisonous character, seems destined to become a serious competitor of saccharine; it was prepared first in 1883 and its sweetening power then recognized; but the cost of manufacture was too great. Patents have now been applied for its preparation from *p*-phenetidine by the action of ammonia and carbon oxychloride. The chemical name for the compound is *p*-phenetol-carbamide and its formula $C_6H_4(OC_2H_5)NHCONH_2$.—*Apotheker Ztg.*, 1892, 550.

Oil of Allium sativum.—From 900 kilos bulbs only 800 gm. oil were obtained, a yield of 0.09 per cent.; the oil has a yellow color and an intense characteristic odor, and is optically inactive; sp. gr. at 14.5° C. = 1.0525; exposed to artificial cold a very small quantity of minute crystals separated; upon heating to 150° C. decomposition ensues with the evolution of very offensive gases. By fractioning under greatly reduced pressure (16 mm.) the following compounds were obtained: $C_6H_{12}S_2$, about 6 per cent., sp. gr. 1.0231 at 15° C., boiling point $66-69^{\circ}$ C. at 16 mm. pressure; $C_6H_{10}S_2$ about 60 per cent., sp. gr. 1.0237 at 14.8° C., boiling at $135-139^{\circ}$; $C_6H_{10}S_3$ boiling at $112-122^{\circ}$, 16 mm. pressure; and $C_6H_{10}S_4$ boiling above 122° C., but decomposing during distillation. The compound $C_6H_{10}S_2$ purified by distillation over a little metallic potassium, boils at $78-80^{\circ}$ C., 16 mm. pressure; it gives precipitates with mercuric, platinic and gold chlorides. The oil was found free from allyl sulphide and sesquiterpene, which have been claimed to be present. *Pure allyl sulphide* made for comparison with these fractions is a colorless oil, sp. gr. 0.8991, at 16° C., boiling under 750 mm. pressure at $136-140^{\circ}$ C., under 15.5 mm. at $36-38^{\circ}$ C. All of the sulphur compounds of the oil, when distilled under ordinary conditions, suffer decomposition.

Oil of Allium Cepa, L.—5,000 kilos of onions only yielded 233 gm. oil 0.005 per cent., of a dark brown color, mobile, sp. gr. 1.041 at 8.7° C.; laevogyre; on exposure to freezing mixtures separating a small quantity of lustrous crystals. Distilled under ordinary pressure the oil decomposes at 160° C., emitting gases of very offensive odor; under 16 mm. pressure the oil can readily be distilled. The chief constituent is $C_6H_{12}S_2$, boiling at $75-83^{\circ}$, at 10 mm.; specific gravity 1.0234 at 12° C.; distillation with a little metallic potassium yields it colorless, with larger quantities of potassium there results colorless $C_6H_{14}S_2$, boiling at $68-69^{\circ}$ C., 10 mm. pressure; by oxidation it yields carbonic, oxalic, sulphuric, propionic, formic and acetic acids. There is present also a higher sulphur derivative, which, by reduction, yields $C_6H_{12}S$. In the fraction above 100° C. is present a sulphur compound probably identical with a constituent of asafoetida oil. All fractions of the oil give, with mercuric, platinic and gold chlorides, white, resp. yellow precipitates. Allyl sulphide, hexenyl sulphides and terpenes were not found in the oil.—F. W. Semmler, *Archiv der Pharm.*, 1892, 434-438.

Borneol acetate,⁴ a constituent of the oils of *Abies sibirica* and *A. pectinata*. These oils yield fractions, all (from the former oil amounting to 25 per cent.) soluble at 17° C. in 3.6 volumes of 70 per cent. alcohol and having the sp. gr. of 0.979 at 20° C., the saponification equivalent 267.5 and the boiling point 210–220° C. De rived of water this fraction crystallizes; the crystals melt between 27–28° C. and boil at 210° C.; in alcoholic solution they are laevogyre. By saponification of these crystals both borneol (the laevogyre variety) and acetic acid were identified. As no other ester is present in this oil, it offers the best material for making laevogyre borneol. A qualitative test proved the presence of the same ester in *A. pectinata*. The oil of *Pinus canadensis* reacting very much like the above oils, probably contains this same constituents.—E. Hirschsohn, *Pharm. Ztschr. f. Russl.*, 1892, 593.

Detection of resin as an adulterant of dammar.—The test depends upon the property of resin to dissolve readily in water of ammonia and upon the addition of acetic acid to reprecipitate; powdered dammar agitated with water of ammonia gives a yellow or red filtrate, which, with acetic acid, remains clear or becomes only slightly opalescent. The ammoniacal filtrate (2 gm. to 20 cc.) acidified with acetic acid gives from a mixture containing 5 per cent. resin a separation of some floccules; 10 per cent. resin yielded a heavy separation; 20 per cent. resin caused the test to form a gelatinous mass so that it could not be filtered.—E. Hirschsohn, *Pharm. Ztschr. f. Russl.*, 1892, 609.

Recently powdered metallic arsenic which, in the process of powdering, had been moistened with water to prevent dusting, is recorded by E. Hirschsohn as capable of spontaneous combustion. A quantity of powdered arsenic in a double paper bag had been received late in the evening, and set aside over night in a basket containing other articles packed in straw and sawdust. The next morning, upon opening the store, the peculiar garlic-like odor attracted attention to the basket containing the powdered arsenic; an examination disclosed that the arsenic had agglutinated to a solid, glowing mass; that the paper containers had been charred, and that a portion of the straw was scorched; a number of bottles in the basket had also burst, owing to the high heat, and upon the charred paper bag were sublimed some beautiful crystals of arsenious oxide. A fire,

which probably would have been attributed to some other cause, was in this case averted—*Pharm. Ztschr. f. Russl.*, 1892, 612.

Estimation of urea.—2.5 cc. urine are mixed in a stoppered flask with 2.5 cc. of a solution containing 50 gm. barium hydrate and 350 gm. barium chloride in a litre; 75 cc. of a mixture of 1 volume ether and 2 volumes alcohol (90 per cent.) added, agitated and set aside until the next day. It is then filtered into a porcelain capsule, the precipitate washed with 50 cc. of the ether-alcohol mixture and the ether-alcohol evaporated on a water-bath at 50–60° C. until about 20 cc. remain. (Should the urine show a high specific gravity, about half a gram of magnesium oxide must be added during this evaporation.) 10 cc. concentrated sulphuric acid are next added and the water-bath raised to 100° C.; after the liquid ceases to evaporate it is transferred and rinsed into a Kjeldahl flask, and this heated upon wire gauze until perfect solution has taken place (which requires several hours). After adding an excess of sodium hydrate the ammonia is distilled, collected, titrated and calculated to nitrogen, which, multiplied by 2.14, gives the urea present in the urine.

This method of Mörner and Sjöqvist somewhat altered by E. Bödtker depends upon the precipitation of all nitrogenous substances except urea and a little free ammonia; during the evaporation the latter escapes (liberated by the $\text{Ba}(\text{OH})_2$ or later by the MgO); by the heating with sulphuric acid urea is decomposed, all of the nitrogen going to form ammonium sulphate; the latter by the sodium hydrate is then decomposed, collected, titrated and the results calculated from this.—*Ztschr. f. physiol. Chemie*, 1892, 140.

*Assay of crude carbolic acid.*⁶—The method published in *Am. Jour. Pharm.*, 1892, 566, has been criticised as not giving reliable results, the chief source of error being due to the fact that no allowance is made for the solubility of the phenols in the salt solution. P. Solmann, in *Pharm. Ztg.*, 1892, 679, gives a method carried out by distilling 100 cc. of the crude phenols and measuring the fractions, allowance being made for water which may be present to the extent of 10 per cent.; the method is stated to be used by the manufacturers in determining the quality of the acid before offering it for sale; the assay can be completed in half an hour. The results obtained in the analysis of three samples will explain themselves:

	I.	II.	III.
Boiling commenced,	103° C.	100° C.	100° C.
Distillate up to 160° C.,	9'5	9'0	11'0 cc.
(including,	1'5	7'5	9'0 cc. water.)
" " 185° C.,	2'5	2'0	1'0 cc.
" " 195° C.,	38'0	49'0	70'8 cc.
" " 200° C.,	30'0	30'5	11'5 cc.
" " 205° C.,	16'0	3'7	2'8 cc.
	<hr/> 96'0	<hr/> 94'2	<hr/> 97'1 cc.
Less the water,	1'5	7'5	9' cc.
Phenols soluble in alkali,	<hr/> 94'5	<hr/> 86'7	<hr/> 88'1 cc.
Tar oils by difference,	4'0	5'8	2'9 cc.

Acetanilide can now be purchased of such purity that the solution in sulphuric acid will stand for hours without showing coloration; one gram boiled with 30 cc. water and one drop of a permanganate solution added will retain the red color for five minutes. Dried at 105° C. it has the melting point of 114° C.—*Pharm. Ztg.*, 1892, 636, 674.

Purification of extract of liquorice—The extract broken into small pieces is dissolved in 6 or 7 times its weight of water, stirring facilitates the operation; into this solution while being stirred there is sifted powdered talcum (in amount equalling $\frac{1}{3}$ of the extract taken) and then a quantity of water of ammonia (sp. gr. 0.960) added sufficient to impart a faint odor ($\frac{1}{50}$ of the weight of the extract is generally sufficient); lastly, a weight of 90 per cent. alcohol is added equalling $\frac{1}{5}$ of the weight of the extract; after continued agitation for 10–15 minutes the vessel is closed and set aside for 1½–2 days to allow the suspended matter to subside; the supernatant liquid will be found perfectly clear, and is separated by decantation; the turbid portion is diluted with water, filtered and washed, and the clear solutions are then evaporated. Another method, although an inferior one, differs from the above by using powdered glycyrrhiza, instead of the powdered talcum (10–12.5 per cent. of the weight of the extract) the separation requires longer time and the sediment becomes more troublesome in washing. In these processes the powders are added to attract the suspended matter and cause them to deposit; the ammonia is added to dissolve free glycyrrhizin which is always present, and the alcohol to facilitate separation of the suspended albuminoid matter also to prevent fermentation; in hot weather a larger proportion of alcohol may be required for this purpose.—H. Hager, *Pharm. Ztg.*, 1892, 650.

AMORPHOUS BORON.¹

BY H. MOISSAN.

A summary of the properties of pure amorphous boron. Boric acid is twice treated with less than the theoretical quantity of magnesium powder, and the product, on treatment with an acid, leaves amorphous boron.

Amorphous boron is a bright, maroon-colored powder which stains the fingers and can be compressed into a cake. Its sp. gr. is 2.45. It does not fuse at the temperature of the electric arc, but shrinks slightly and increases in density when heated to 1,500° in an atmosphere of hydrogen. Its electrical conductivity is very low, the specific resistance being 801 megohms.

Boron takes fire in the air at 700°, and burns in oxygen with a brilliant green flame having little actinic power; in either case the combustion is soon stopped by the formation of a layer of boric anhydride on the surface of the boron. It combines energetically with sulphur at 610° to form a sulphide which is decomposed by water with evolution of hydrogen sulphide; it behaves in the same way with selenium, but does not combine with tellurium.

Boron burns in dry chlorine at 410°, and in bromine vapor at 700°, with the formation of boron chloride and bromide. It is dissolved by bromine water, and more readily by a solution of bromine in potassium bromide solution, but it does not combine with iodine.

It combines with nitrogen at 1,230°, but not directly with phosphorus, arsenic or antimony. Neither does it combine directly with carbon or silicon, although a boron carbide is formed when boron is heated in the electric arc in an atmosphere of hydrogen.

The alkali metals have no action on boron, but magnesium combines with it at a red heat. Iron and aluminium form borides only at high temperatures, whilst silver and platinum combine with it quite readily.

Acids react energetically with boron; sulphuric acid is reduced at 250°; the action of nitric acid is so vigorous as to raise the temperature to incandescence; phosphoric anhydride is reduced to phosphorus at 800°; arsenious and arsenic acids are reduced to arsenic at a dull red heat; iodic acid in solution is reduced to iodine in the cold, and

¹ *Compt. rend.*, **114**, 617-622; *Jour. Chem. Soc.*, Octbr., 1892, p. 1153.

a mixture of the dry acid with boron becomes incandescent, and iodine is evolved; chloric acid is reduced to chlorous acid.

The hydracids react with greater difficulty. Hydrogen fluoride is not attacked until a dull red heat is reached, when boron fluoride is formed and hydrogen liberated. Hydrogen chloride is attacked only at a bright red heat, whilst its aqueous solution has no action whatever on boron.

Sulphurous anhydride is reduced to sulphur at an incipient red heat. Steam is not attacked until a full red heat is attained, but the action, once started, proceeds with great energy, boric acid being formed and hydrogen set free. Carbonic oxide is reduced to carbon at $1,200^{\circ}$. Silica is reduced to silicon when heated in a forge. Nitrous oxide is decomposed by boron at a dull red heat, boron nitride and boric acid being formed; nitric oxide is not affected by it.

Metallic oxides are more readily reduced by boron than by carbon. When, for instance, a mixture of boron and cupric oxide is heated in a glass tube, the reaction which ensues is so violent as to melt the glass. Stannous oxide, litharge, antimonious and bismuth oxides are all readily reduced. A mixture of boron and lead peroxide detonates violently when triturated in a mortar. Ferric and cobaltous oxides are reduced at a red heat, but the oxides of the alkaline earths are not affected. Hydrogen is liberated by boron from fused potassium hydroxide. A mixture of boron, sulphur, and nitre deflagrates at a dull red heat, whilst small quantities of boron projected into fused potassium chlorate burn with a most dazzling flame.

Boron acts very energetically on the metallic fluorides; it decomposes the fluorides of the alkalis and alkaline earths at a bright red heat; zinc fluoride at a dull red heat, boron fluoride being formed; and it acts with even explosive violence on lead and silver fluorides. Its action on the metallic chlorides is not so energetic. The chlorides of the alkalis, the alkaline earths, zinc and lead are not attacked at a red heat, but mercurous chloride is reduced to mercury at 700° . Lead, zinc, cadmium and copper iodides are not reduced by boron, but tin and bismuth iodides are reduced with facility. Potassium, sodium, calcium and barium sulphates are reduced by boron at a red heat to the corresponding sulphides.

Notwithstanding its great affinity for oxygen, boron may be immersed in fused potassium nitrate without any reaction occurring.

provided that the temperature is below that at which oxygen is disengaged. Fused potassium nitrite, however, is decomposed by it with great violence. Sodium carbonate is reduced at a dull red heat, potassium carbonate at a somewhat higher temperature, and calcium and barium carbonates not at all.

The arsenites, arsenates and chromates are all reduced at a dull red heat.

Boron behaves also as a reducing agent in the wet way. It reduces potassium permanganate solution, partially in the cold, entirely on heating. It reduces ferric chloride to ferrous chloride. It precipitates silver from silver nitrate solution in fine crystals, and reduces palladium, platinum and gold from solutions of the chlorides of these metals.

Boron thus combines with the non-metals much more readily than with the metals. It is a more powerful reducing agent than either silicon or carbon, and, on the whole, is most nearly allied to the latter element.

ACTION OF NITRIC ACID ON METALS.¹

BY C. MONTEMARTINI.

In the experiments described in this paper, the metals cadmium, iron, nickel and cobalt were respectively dissolved in nitric acid of various degrees of concentration, at least 20 times the amount of acid required for solution being used so as to exclude secondary reactions as far as possible.

The experiments were principally carried out at a temperature of 8°, and the results are given in a series of tables. From these it appears that the evolution of ammonia is not limited to dilute solutions of nitric acid; thus, for instance, 0.00139 gram of ammonia was formed per gram of cadmium dissolved in 47 per cent. nitric acid; 0.0051 gram of ammonia per gram of iron dissolved in 52 per cent. nitric acid; and 0.01839 gram of ammonia per gram of cobalt dissolved in 42.8 per cent. nitric acid.

The gases evolved by the dissolution of 1 gram of the following metals in excess of 27.5 per cent. nitric acid were as follows:

¹ *Gazzetta*, **22**, i, 250-265, and 277-343; *Jour. Chem. Soc.*, 1892, p. 1278.

	NH ₃ .	HNO ₂ .	N ₂ O.	N.	NO.	Total grams.
Cadmium,	0'00197	0'00695	0'00570	0'00033	0'00216	0'01691
Iron,	0'02493	0'00195	0'00422	0'00045	—	0'03553
Nickel,	0'01874	0'00060	0'00749	0'00071	—	0'02754
Cobalt,	0'02538	0'00077	0'00927	0'00467	—	0'04009

These numbers agree neither with the hypothesis that the dissolution of the metal is accompanied by the formation of nascent hydrogen, nor with that of the direct oxidation of the metal by the acid. No hydroxylamine is found amongst the final products of the reaction; this compound, if formed, must therefore be immediately destroyed by a secondary reaction. The nitric oxide is always of secondary origin, being derived in the case of cadmium, nickel and cobalt from the decomposition of nitrous acid, and in the case of iron partly from the same source and partly from the oxidation of the ferrous salts first formed. The author holds that nitric acid acts as an oxidizing agent in conjunction with the water present, the latter entering into the reaction.

The investigations were also extended to *zinc*. The products formed in the reaction at a low temperature when the acid is in large excess are nitrous acid, hyponitrous acid, nitric oxide, nitric peroxide, nitrous oxide, nitrogen and ammonia. Under the conditions mentioned, hydroxylamine is not found among the final products of the reaction, and free hydrogen is never evolved. With the exception of nitrous acid and nitric peroxide, the above products are formed, whatever the degree of concentration of the acid; no nitrous acid is, however, formed if the solution contains more than 30 per cent. of nitric acid, and no nitric peroxide if it contains less.

Ammonia.—At a temperature of 3–8°, the quantity in solution rises rapidly until the concentration of the acid is 10 per cent., then slowly until a maximum is attained between 40 and 45 per cent.; it falls abruptly at 47 per cent., and at 53 per cent. only a very small quantity is produced, which gradually diminishes with increased concentration, and may be represented by a straight line passing through the zero point at 100 per cent. At a temperature of 85°, the maximum occurs at a concentration of 9 per cent., when it is equal to the production at the lower temperature; it then falls

rapidly as the concentration is increased to 15 per cent.; beyond this point it may be represented by a line passing through the zero point when the concentration is 100 per cent.

Nitrous Acid.—At a temperature of 18–21°, the production increases rapidly with the temperature until a concentration of 14 per cent. of nitric acid is attained; it then falls with equal rapidity with increase of concentration to 30 per cent., at which stage nitrous acid ceases to appear among the final products.

Nitric Peroxide.—Between 18° and 22°, nitric peroxide is first formed at a concentration of 27 per cent. of acid; it increases slowly at first, rapidly between 64 per cent. and 72 per cent.; beyond 80 per cent. it remains almost constant.

Nitrous Oxide.—The formation of this compound takes place in comparatively large quantities and with great regularity. It reaches a maximum at a concentration of 40 per cent. acid and a minimum at 80 per cent.

Nitrogen is only formed in very small quantities in acid of all degrees of concentration.

The *velocity* of the dissolution of the zinc in nitric acid increases regularly with the concentration of the acid below 25 per cent.; it then falls slightly, remains constant between 33 per cent. and 42 per cent., then diminishes regularly, attaining its minimum value at a concentration of 68 per cent.; a considerable rise then takes place with increased concentration, but the previous maximum value is not again attained.

In conclusion, the author points out that the hypotheses that the reduction of nitric acid is effected by the direct action of zinc or by nascent hydrogen, both fail in certain cases, as a larger quantity of reduction products is formed than would be theoretically possible, and suggests that the water present enters into the reaction.¹

SESQUITERPENES.²

While the characteristics of the terpenes are now tolerably well known, so that the recognition of the various isomers is no longer very difficult, and the knowledge of the mutual relations, as well as

¹ The author, in referring to previous researches, makes no mention of those of Veley on the action of nitric acid on metals.—EDITORS Jour. Chem. Soc.

² Abstract of a memoir by O. Wallach and W. Walker, in *Annalen*, September 17; reprinted from *Phar. Jour. and Trans.*, Novbr. 12, 1892.

the constitution of the hydrocarbons, $C_{10}H_{16}$, is in a fair way to be extended, the hydrocarbons $C_{15}H_{24}$ are still enveloped in obscurity. These bodies are thick liquids, easily resinified, and boiling between 250° and 280° C. The number of isomers is undoubtedly great, but hitherto only one of the series has been definitely identified.¹

In the investigation of the $C_{15}H_{24}$ compounds the same methods have to be adopted as in the study of the terpenes.²

Several substances are described as having the formula $C_{15}H_{26}O$, which may be regarded as hydrates of the hydrocarbons $C_{15}H_{24}$; for instance, cubeb camphor and patchouli camphor. It is known that the latter is convertible by dehydrating agents into $C_{15}H_{24}$, but this product has not been further investigated and no attempt has been made to hydrate a $C_{15}H_{24}$ body, so as to obtain artificially a body corresponding to the hydrate occurring naturally.

In operating upon patchouli camphor it was easily ascertained that under the same conditions, that turpineol $C_{10}H_{18}O$ is converted into $C_{10}H_{16}$, such as boiling with dilute acids, patchouli camphor may be converted into $C_{15}H_{24}$. The reproduction of the crystalline hydrate from the hydrocarbon could not be effected.

To obtain further knowledge of the capacity of sesquiterpenes to become hydrated, the sesquiterpene of clove oil was tried and found to be readily convertible into a crystalline hydrate, quite different from patchouli camphor. Caryophyllene, the sesquiterpene of clove oil distils over between 250° and 260° , and its hydration was effected by adding 25 grammes to a mixture of 1000 grammes glacial acetic acid, 20 grammes concentrated sulphuric acid, and 40 grammes water, heating the whole for twenty-four hours on a water-bath. The dark-colored liquid was then distilled in a current of steam. A thin oil, of ethereal odor, was thus obtained, which separated on addition of water to the first part of the distillate. Subsequently, a less volatile oil was obtained, which solidified on cooling. After separating the oily portion by cooling and absorption, this crystalline substance was purified by redistillation and crystallization from alcohol. It proved on analysis to be the hydrate of caryophyllene, $C_{15}H_{25}OH$, boiling at 287° to 289° , and melting at 94° to 95° . It is almost insoluble in water, slightly soluble in hot water, readily

¹ *Annalen*, 238, 78; 252, 150.

² *Berichte*, 24, 1526.

soluble in ether, alcohol, and most other solvents. In the solid state it is almost without smell, but the vapor has the odor of pine needles. The chemical characters of this substance prove it to be an alcohol. The chloride, bromide, iodide and nitrite were prepared; they are crystallizable substances, optically inactive and very stable. The iodide subjected to the action of sodium yielded a crystallizable hydrocarbon, melting at 135° C., which gave, on analysis, results pointing to the formula $C_{30}H_{50}$, and at least showing that the treatment had given rise to the production of a hydrocarbon of high molecular weight, closely related to the terpene group.

Dehydrating agents convert the alcohol into a liquid hydrocarbon, clovene, boiling between 261° and 263° ; its specific gravity was 0.930 at 18° C. Its composition is represented by the formula $C_{15}H_{24}$, but as it could not be reconverted into the alcohol it was evidently distinct from caryophyllene.

Out of a large number of oils containing sesquiterpenes only one was found to yield material from which the above described alcohol could be obtained in the same manner. The fraction of copaiba oil, distilling between 250° and 270° , gave the desired result, and the crystalline alcohol prepared from it proved to be identical with that from clove oil. The identity of this hydrocarbon with that in clove oil was also proved by the production of a nitroso chloride $C_{15}H_{24}NOCl$, a white sparingly soluble powder that blackened and decomposed at 161 – 163° , and was readily converted by reaction with piperidine into a nitrolamine.

The terpenes, $C_{10}H_{16}$, are known to be susceptible of reduction to hydrocarbons of the formula $C_{10}H_{20}$,¹ and by operating upon the dihydrochloride, $C_{15}H_{24}2HCl$, with hydriodic acid, a hydrocarbon of the composition $C_{15}H_{28}$ was obtained, the characters of which, as compared with those of the original sesquiterpene, are as follows:

	$C_{15}H_{24}$	$C_{15}H_{28}$
Specific gravity, . . . . .	.918	.872
Boiling point,	274 – 275°	257 – 260°

The sesquiterpenes may be classed in two groups, those with one ethylene bond and those with two. The best known representative of the latter is the frequently occurring laevorotatory sesquiterpene, which forms with two molecules of hydrochloric acid a well-defined

¹ Berthelot, *Jahresb.*, 1869, 333.

crystallizable compound. This hydrocarbon exists in cubeb oil,¹ savin oil,² cade oil,³ betel oil,⁴ camphor oil,⁵ galbanum oil,⁶ patchouli oil,⁷ juniper oil,⁸ asafoetida, coto oil,⁹ and olibanum oil. It appears to be as widely distributed as limonene. Of the numerous names which might be given to it on account of its varied occurrence, that of cadinene is suggested by Wallach as the most convenient, because the oil of cade, juniper tar oil, is the most accessible and the cheapest source of the substance.¹⁰

Caryophyllene is essentially different from cadinene. Its physical constants have not been determined precisely, but it certainly boils at a somewhat lower point than cadinene. With halogen acids it forms only liquid addition products. By addition of 1 molecule of water it yields a saturated alcohol $C_{15}H_{26}O$. But it must be remembered that in conversion into the alcohol caryophyllene appears to be isomerized. Well-defined crystalline halogen compounds can be obtained from the alcohol, containing only one atom of halogen and presenting the characters of fully saturated stable compounds. But hitherto it has not been possible to obtain these halogen compounds directly from caryophyllene.

By separation of water from the alcohol a different sesquiterpene, clovene, is obtained. This differs essentially from caryophyllene, since it is not convertible into the alcohol $C_{15}H_{26}O$ by warming with dilute sulphuric acid, and since it apparently does not form a crystallizable nitroso chloride. The boiling point of clovene is lower ($261-263^{\circ}$) and the specific gravity higher (0.930) than that of cadinene. Apparently clovene has only one ethylene bond in its molecule. This cannot be affirmed of caryophyllene until its physical constants have been determined with greater certainty.

The hydrocarbon isomeric with caryophyllene, which is generally associated with cadinene in ethereal oils and differs from cadinene

¹ *Annalen*, 238, 78.

² *Ibid.*, 238, 82.

³ *Ibid.*, 238, 82.

⁴ *Jour. p. Chem.*, 39, 355.

⁵ *Jour. p. Chem.*, 39, 355; and *Annalen*, 114, 193.

⁶ *Annalen*, 238, 81.

⁷ *Ibid.*, 238, 81.

⁸ Schimmel's *Berichte*, April, 1890.

⁹ *Arch. f. Pharm.*, 229, 17.

¹⁰ *Annalen*, 252, 150.

in not forming crystalline addition compounds with halogen acids, is certainly different from caryophyllene. It remains to be seen whether this frequently occurring hydrocarbon is related to clovene. The product obtained by dehydration of patchouli camphor, or, more correctly, patchouli alcohol, may be regarded as a distinct sesquiterpene. From its peculiar cedar smell, differing altogether from the previously described hydrocarbons, there is some reason to suspect relation to cedrene, which occurs so abundantly in cedar oil, but the determination of this question must be left for future inquiry.

For the identification of sesquiterpenes the most useful compounds will be the hydrates, which may be regarded as the alcohols of the sesquiterpene series, standing in the same relation to the hydrocarbons as terpineol does to dipentene. These hydrates, hitherto designated by the inappropriate generic name of "*camphors*," will form the subject of further investigation in the laboratory of the Chemical Institute of the University of Göttingen. The experimental part of the investigation, described in the foregoing abstract, was carried out by Mr. W. Walker, of Pittsburg, in conjunction with Professor Wallach.

NOTE ON ETHER AS A MENSTRUUM IN MEDICATION BY THE SKIN.¹

BY SIR JAMES SAWYER, M.D., LOND., F.R.C.P.
Consulting Physician to the Queen's Hospital, Birmingham.

May I especially invite the attention of pharmacists to the advantages of ether as a menstruum, for the preparation of remedies which are designed to act through the skin? Confirmed and extended as my views have been by experience in practice, I venture to think the proposals I made to the medical profession, two years ago, concerning this use of ether, indicate a practical advance in our remedial resources which promises further useful application, both in human and in comparative therapeutics.² Not every officinal compound "for outward application only" can be accredited with percutaneous energy. Until ethereal tinctures and liniments were used, we were accustomed in medical practice to present many

¹ From the Pharmaceutical Journal and Transactions, Oct. 15, 1892, p. 301.

² See the *Lancet*, May 17 and June 20, 1890, and my "Contributions to Practical Medicine," of the same year.

remedies and many different preparations to the skin, with the view of producing remote or local effects, or both, in the form of compounds very ill designed for their special purpose. The officinal formulæ of outward applications include emplastra, various liniments, of alcoholic, saponaceous, or oleaginous composition, and certain fatty unguents. Of these medicaments for enepidermic use the oily liniments and the ointments, because of their easy admixture with the sebaceous secretion of the human skin, are probably the most active. I am afraid the structure of none of the fourteen plasters of the British Pharmacopœia is such as to permit the absorption of its active ingredients by the skin. The body of an officinal plaster is made of litharge in union with oleic, margaric and stearic acids, or of wax, of lard, of frankincense, of resin, of soap, of suet, and of some fixed oils, in various combinations. "Neither a plaster so formed," as I wrote in one of my former papers upon this subject, "nor a solution in alcohol of the active principles of drugs is a scientific medicament for enepidermic employment and percutaneous action, if we have regard to the structure and physiology of the human skin." In practice it is found that there are at least three separate obstacles to the absorption of a medicine through the skin, namely, the fatty sebaceous secretion of the skin, the epidermis, and insolubility of the drug. So far as I know, ether is the best menstruum for the solution of many remedies for local use through the skin. It is a good solvent of the active principles of many drugs, and it is a ready solvent of the fatty constituents of the sebaceous secretion of the skin. An ethereal liniment supplies the most intimate application of a remedy to the bare dermal surface. Dr. Lauder Brunton has written: "It would appear that the fat of the skin, as well as the epidermis, presents an obstacle to the absorption of substances in solution; but when they are applied in such a form that they can readily mix with the sebaceous matter of the skin, they are tolerably readily absorbed; as, for example, when they are used in the form of ointment. * * * They are absorbed also when dissolved in ether, and especially in chloroform, even when simply painted over the surface. Alcoholic solutions are not absorbed when painted in this way." Chloroform has many disadvantages, but ether is an excellent agent, for use either as a menstruum, in tinctures for external employment, or as a simple solvent, for the preparation of a liniment.

I have proposed and used several ethereal tinctures for dermal employment; namely, of belladonna (tinct. bellad. ætherea), of capsicum, of iodine and of menthol. I expect physicians and pharmacists will find other useful developments of ethereal preparations as remedies applied to the skin.

COLORING MATTERS OF THE VINE: AMPELOCHROIC ACIDS.¹

BY A. GAUTIER.

The rapidity with which grapes ripen in Mid Europe led the author to suppose that the skin pigment to which the color is due is formed by the oxidation of aldehydic or catecholic substances, originating in the leaves and travelling thence to the fruit. This view was borne out by the effects following the removal of the leaves from grapes about to ripen, or by the partial or complete stoppage of the circulation between the leaves and stem, the grapes in the first case remaining in a state of arrested-development, whilst in the second the leaves changed in color to red or brown, and not the grapes.

The coloring matter of leaves thus reddened (from plants of the Carignan stock) was extracted with tepid water and purified by fractional precipitation with lead acetate, with which it finally formed an olive-green precipitate; this, on decomposition with hydrogen sulphide and purification, yielded a mixture of two colored crystalline acids, α - and β -ampelochroic acids. These were separated by means of cold water, in which the latter alone is soluble.

α -Ampelochroic acid, $C_{19}H_{16}O_{10}$, is bibasic and forms a cochineal-colored powder consisting of ruby-red plates or spindles, soluble in boiling water or cold alcohol, but insoluble in ether. Its solutions are feebly acid to litmus. The *zinc* salt is olive-green, and turns indigo-blue on heating, the *acid zinc* salt is rose-colored and soluble; the *lead* salt is dark green, and blackens at 50° ; the *acid lead* salt is wine red. Solutions of α -ampelochroic acid are turned greenish-brown by alkalis, and oxidize on exposure to the air; they are precipitated by bromine-water; they give a greenish-black precipitate with ferric salts, a dark-brown precipitate with mercuric nitrate, a yellowish-gray precipitate with silver nitrate, especially in presence of

¹ *Compt. rend.*, **114**, 623-629; *Jour. Chem. Soc.*, October, 1892, p. 1242.

ammonia, a rose colored precipitate with gelatin solution, and a chestnut-brown precipitate with cinchonine acetate. The acid therefore belongs to the classes of tannins and polyphenolic substances.

β-Ampelochroic acid, which is stated to have the composition $C_{26}H_{24}O_{15}$, bears a general resemblance to the α -acid. It forms cochineal-colored crystals, and its aqueous solution is feebly acid to litmus and feebly astringent to the taste. It is precipitated by gelatin and by cinchonine acetate; it gives a violet precipitate with tartar emetic, a dark-green precipitate with zinc acetate, a dirty, rose-colored precipitate with mercuric nitrate, a yellowish-brown precipitate with copper acetate, and a chestnut-brown precipitate with hot silver nitrate. Potash turns the color of its solution to yellowish-green, and ferric chloride gives a dark violet coloration, changing to a brown precipitate.

A third acid of the same general character as the others was obtained from the first fraction or blue precipitate formed in their preparation. The precipitate was suspended in water, decomposed with hydrogen sulphide, partially saturated with baryta water, and the whole evaporated to dryness in a vacuum. The residue was extracted with ether to remove impurities, and the new acid was dissolved out with alcohol.

γ-Ampelochroic acid, $C_{17}H_{18}O_{10}$, crystallizes in reddish-brown octahedra and dissolves readily in water to a red solution, astringent to the taste. With gelatin and tartar emetic, it forms rose-colored precipitates which dissolve on heating; with mercuric nitrate, it gives a pale, greenish-blue precipitate, a green precipitate with calcium acetate, an olive-green precipitate with basic lead acetate, a dark violet to brown precipitate with ferric salts, and an orange to yellow precipitate with bromine water. Potash changes the color of its solutions to olive-green.

DETECTION OF HIGHER ALCOHOLS IN SPIRITS OF WINE.¹

BY C. BARDY.

A preliminary examination is made by agitating 10 cc. of the alcohol with cc. of a saturated salt solution. If an oily upper layer does not separate, 100 cc. of the alcohol is agitated with 450 cc. of a saturated salt solution in a vessel provided with a stop-cock; suffi-

¹ *Compt. rend.*, **114**, 1201-1204; *Jour. Chem. Soc.*, Novb., 1892, p. 1379.

cient water is added to redissolve the salt that is precipitated, and then 60 to 70 cc. of carbon bisulphide, and the mixture is well agitated. After a short time, the bisulphide is transferred to a smaller similar vessel, and the extraction is repeated a second and third time with similar quantities of carbon bisulphide, the whole of the latter being transferred to the second vessel. In order to separate the alcohols from the bisulphide, the latter is mixed with sufficient concentrated sulphuric acid (about 2 cc.) to form a heavier layer at the bottom of the vessel, and, after vigorous agitation, the acid is transferred to a smaller vessel. The extraction is repeated several times with 1 cc. of acid each time, and the various quantities of acid are mixed, heated at 50–60°, and a current of air passed over the surface of the liquid until all the bisulphide is expelled. An equal volume of glacial acetic acid is then added, and the mixture heated on a water-bath at about 100° for a quarter of an hour, the flask being fitted with a reflux condenser. When the action is complete, the contents of the flask are poured into 100 cc. of saturated salt solution. If higher alcohols were originally present, the corresponding acetates separate and form an upper layer, the volume of which can be measured by any of the usual methods, the liquid being previously cooled to 15°. The number of cubic centimetres of acetates multiplied by 0.8 gives the percentage of higher alcohols in the alcohol examined.

If in the preliminary test an oily upper layer separates, only 25 cc. of the alcohol should be taken and mixed with 100 cc. of saturated salt solution and 8 to 10 cc. of water. The quantity of carbon bisulphide, however, ought not to be reduced, and all the other operations are conducted in the manner described.

The carbon bisulphide dissolves only butyl and amyl alcohols, and if propyl alcohol is sought for, the salt solution that has been extracted with bisulphide is filtered and distilled until an alcoholometer in the receiver marks 50°. The quantity of propyl alcohol in the distillate is estimated by titration with permanganate (Barbet) or by Gossart's method.

Alcohol in the distillery residues known as "essential oils" may be determined by a modification of this method. 500 cc. is agitated with an equal volume of salt solution, and the latter is extracted with three successive quantities of carbon bisulphide and afterwards distilled. The alcoholic strength of the distillate, corrected, if neces-

sary, for the presence of propyl alcohol and calculated to the original volume, gives the percentage of alcohol present.

This method will detect 0.5 per cent. of higher alcohols in spirits of wine. Greater sensitiveness can be obtained by working with a larger quantity of the alcohol, but in this case a correction must be made on account of the ethyl acetate formed from the alcohol dissolved by the carbon bisulphide.

KOUMISS.¹

BY D. H. DAVIES.

Papers upon this subject have from time to time appeared in the Journal, but it is curious to note how careful most of the authors have been to evade giving detailed particulars regarding the difficulties that have to be surmounted in the manufacture of aerated milk preparations.

The original Koumiss is the Russian, made from mare's milk, which is used for the obvious reason that it is less rich in casein and fatty matter than cow's milk, and therefore far more easy of digestion.

Mare's milk contains approximately 1.70 per cent. of casein, and 1.40 per cent. of fatty matter, whereas cow's milk contains 4.55 of casein and 3.70 of fatty matter.

I think I am correct in stating that cow's milk is universally used in this country, and it answers the purpose admirably in most instances, but a better preparation is obtained by diluting with water to reduce the percentage of casein, etc.

Mare's milk contains 8.75 of milk sugar, cow's milk only 5.35; it is therefore necessary to add some of this to our preparation. The following formula answers very well. Take of—

Fresh milk,	12 oz.
Water,	4 oz.
Brown sugar,	3 iiss.
Compressed yeast,	gr. xxiv.
Milk sugar,	3 iij.

Dissolve the milk sugar in the water, add to the milk, rub the yeast and brown sugar down in a mortar with a little of the mixture, then strain into the other portion. Strong bottles are very essen-

¹From the Pharmaceutical Journal and Transactions, Oct. 15, 1892, p. 301.

tial, champagne bottles being frequently used, and the corks should fit very tightly; in fact, it is almost necessary to use a bottling machine for the purpose, and once the cork is properly fixed it should be wired down. Many failures have resulted because the corks did not fit properly, the result being that the carbonic acid gas escaped as formed and left a worthless preparation. It is further necessary to keep the preparation at a moderate temperature, and to ensure the article being properly finished the bottles are to be gently shaken each day for about ten minutes to prevent the clotting of the casein. It is as well to take the precaution of rolling a cloth round the bottle during the shaking process, as the amount of gas generated is great, and should the bottle be of thin glass or contain a flaw it may give way. Some few days elapse before the fermentation passes into the acid stage, and when this has taken place the preparation is much thicker. It is now in the proper condition for allaying sickness, being retained by the stomach when almost everything else is rejected.

Malted Koumiss can be made as follows:

Extract of malt,	3 iss.
Compressed yeast,	gr. xx.
Brown sugar,	gr. x.
Milk, to champagne pint.	

Euonymized Koumiss is a suitable preparation for use in some cases of derangement of the liver in which food is rejected and an hepatic stimulant is required, combined with a slight sedative. To prepare this add fluid extract of euonymus, 3 iij, to every 16 ounces of the diluted milk, then proceed as with ordinary koumiss.

Coca Koumiss could be made by the addition of cocaine hydrochlor. to the milk, and would be specially adaptable in cancer of the stomach.

Aerated whey, which is a very refreshing drink in cases of fever and much used in some parts of Germany, could also be manufactured on the same principle as koumiss.

Peptonized Koumiss.—The easiest way of getting a satisfactory preparation is by the adoption of the following formula:

Papaine,	gr. vi.
Milk, to champagne pint.	
Compressed yeast,	gr. xx.
Brown sugar,	3 iij.

This does not keep very long.

Meat and Malt Koumiss would constitute a serviceable preparation in consumption.

Chemists dealing in these preparations should impress upon the minds of their customers, the necessity of keeping the bottles in a cool place, and the advisability of using either champagne or soda water taps, so that the bulk of the gas may not escape with the first draught.

THE ARROWROOT PLANTATIONS OF COOMERA AND PIMPAMA, QUEENSLAND.¹

BY H. L. THOMPSON.

The arrowroot grown in the township of Coomera is the purple variety—the *Canna edulis*. It sometimes grows to a height of eight feet, bears a pretty scarlet flower, and a dark purple seed pod follows, which is generally sterile. The best variety of arrowroot, the *Maranta arundinacea*, which is grown so extensively in the Bermudas, thrives well in this district; but its cultivation has been almost abandoned, owing to the difficulty of manufacture. This kind attains the height of two feet, and bears, at maturity, a small white flower somewhat resembling the potato blossom. In the districts of Coomera and Pimpama there are from 250 to 300 acres under cultivation.

The mode of cultivation is as follows: The ground is ploughed in ridges of about forty-six feet wide, and thoroughly harrowed and scarrified. Nine rows are placed in this, five feet apart, leaving six for the row in which the by-furrow comes. Shallow furrows, five inches deep, are run with the plough, then the smaller bulbs, about the size of a small apple, which are found growing at the bottom of the stems, are placed four feet six inches apart in the drill, and covered by turning a furrow from each side on to the top of the bulbs. Afterwards, cultivation is carried on by keeping the ground clear of weeds by means of horse-hoes or scufflers. When the plant reaches the height of about three feet, the space between the rows is turned up with a one-horse plough, the soil thrown towards the plant, and a furrow left in the middle. It requires nothing further till it is dug up for the mill. When the tubers have come to maturity, which is generally in ten months or a year, the crop is ready. The stalks of the plant are then cut off as close as possible

¹From the *Pharmaceutical Journal of Australasia*, August, 1892, p. 87.

to the tubers with a cane knife or strong reaping hook. The tubers are then raised with grubbing hoe or mattock. With all speed they are placed in carts and conveyed to the mill, for the color is seriously affected by being exposed to the sun or weather before grinding. Sometimes as much as 50 lbs. of tubers are obtained from one plant.

The machinery consists of a six-horse power engine, a root-washer, grinding mill, cylinder, sieves for separating the farina from the fibre and pulp, and a centrifugal for drying. The root-washer is a trough ten feet long, three feet deep, and two feet in diameter. This has a half circular bottom, through which a stream of water is constantly running. A spindle having pegs about four inches apart, and of a sufficient length to reach within an inch of the bottom and sides, revolves in the trough. The pegs cleanse the bulbs of all dirt and they gradually work down to one end of the trough. A wooden rake pushes the bulbs out into a continuous belt elevator, and thence they are conveyed to the hopper of the mill. This is a wooden drum two feet six inches on the face, and two feet in diameter. It is covered with a sheet of galvanized iron, punched and placed on with the burr on the outside. The drum revolves at great speed, and a stream of water falls on it from tanks fixed above. Thus the bulbs are grated up, the bulbs and the water passing through the sieve No. 1, which is a cylinder eight feet long with the bottom half perforated with holes about the size of a No. 7 wire nail. Within this a beater revolves, forcing the water and farina through the holes, and being placed on the screw the pulp and fibre are forced out at the end. The farina and water pass into sieve No. 2, which is similar to No. 1, only with holes about the size of a large pin-head in the bottom of copper. After this the liquid runs along a trough two feet wide, six inches deep, and seventy feet long. The farina is deposited at the bottom of this, and the water passes off. The farina is now dug out, and passed through sundry more sieves, washed by hand and in tubs, then finally left to subside. When pretty firm it is taken out and passed through a centrifugal machine. It is now placed on the drying frames. These are wooden frames about six feet six inches long, with marsupial netting and calico stretched upon them. They are placed away from any dust or smoke, and the wind passing underneath, as well as the sun above, aids in the drying process. But the sun and air are not alone

trusted with the drying. A drying house has been erected, capable of accommodating 180 frames. This is heated by steam pipes to 140° F. The value and market price of arrowroot depends so much on the color and quality, that the greatest care is necessary throughout its manufacture, and only very clear water is used in the washing.

SOLUTIONS OF MEDICINAL RESINS.¹

By HAROLD WYATT, JUNR.

Early in the year my interest was excited by a question asked at one of the meetings of the Liverpool Pharmaceutical Students' Society as to the best method of making a solution of jalap resin in glycerin for use as a rectal injection. The usual mode of dealing with similar bodies, by dissolving them in alcohol and making the resulting solution into an emulsion, could not be followed, owing to the manner in which the preparation was to be administered and as jalapin is practically insoluble in glycerin, a simple solution was out of the question. On using the *sapo jalapæ* of the German Pharmacopœia—made by dissolving 4 parts each of Castile soap and jalap resin in 8 parts of alcohol and evaporating to 9 parts—not more than an equivalent of 2 grains of jalap resin could be got into a fluid drachm of glycerin without increasing the viscosity of the liquid to such an extent that it did not run easily from the syringe. Bearing in mind a paper on the use of resin soap as an emulsifying agent, read by Mr. Collier, of Guy's Hospital, at an evening meeting of the Pharmaceutical Society, in March, 1890, it struck me that, as most resins dissolve in alkaline solutions, forming soaps, jalap resin would, when similarly operated on, behave in like manner and moreover the soap formed would act as an emulsifier to any of the constituents of the resin not saponifiable. Reference to "Pharmacographia" eliciting the fact that jalap resin was soluble in alkaline solutions I put the idea into practice, but had to abandon the use of potassic or sodic hydrate for the purpose, in consequence of the difficulty there was in obtaining a neutral soap solution. Finally, by using solution of ammonia as the saponifying agent, and evaporating the resulting liquid after the addition

¹ Read before the Liverpool Pharmaceutical Students' Society; reprinted from the Chemist and Druggist, Octbr. 29, 1892.

of a little glycerin, I obtained a solution which was quite neutral, containing 6 grains of jalapin to the fluid drachm and capable of dilution with water in any proportion without precipitation of the resin. The manner of working was as follows:

Three hundred and eighty-four grains of jalapin (insoluble in ether) were mixed with 3 oz. of strong solution of ammonia and allowed to stand, with occasional shaking, for two days. The resulting solution was placed in a water-bath, 2 oz. of glycerin were added, and the whole evaporated, with constant stirring, until ammoniacal fumes were no longer given off, the liquid being made up when cold to 8 fluid oz. with glycerin. On trial in the Liverpool Royal Infirmary this preparation was found to be both active and reliable. Subsequently I made in a similar way a series of solutions containing respectively resin of scammony, podophyllin and aloin, all of which turned out satisfactorily. Guaiacum resin gave a solution which deposited a good deal on standing; the supernatant liquid, doubtless ammonium guaiacate, was found useful as an addition to gargles and gelatin throat pastilles. In publishing this note I wish to draw attention to a method which I believe is capable of extended application in making liquid preparations of drugs which owe their activity wholly or in part to resins or resinoid bodies—such, for instance, as cascara sagrada and podophyllum.

THYROID EXTRACT: ITS PREPARATION FOR THE TREATMENT OF MYXÆDEMA.¹

By EDMUND WHITE, B.Sc., LOND. F.I.C., Pharmaceutist to St. Thomas' Hospital.

The hypodermic injection of a glycerin extract of the thyroid gland of the sheep has been advocated as a remedy for myxædema (see *British Medical Journal*, October 10, 1891, and April 16, 1892). In St. Thomas' Hospital an extract, prepared by the method given below, has been used with satisfactory results.

To obtain the glands, it is best to go to the slaughter house when sheep are being killed. Take a scalpel, pair of forceps, and a stoppered bottle, all of which must be thoroughly cleansed and rinsed with 5 per cent. aqueous solution of carbolic acid. As soon as the sheep is dead, have the skin removed from the neck, and, with the animal lying on its back, make a median incision, extending from

¹ From the *Pharmaceutical Journal and Transactions*, Octbr. 22, 1892, p. 321.

beneath the chin nearly to the breast, so as to expose the trachea. The thyroid consists of two lobes, situated in the upper part of the neck, one on each side of the trachea, and connected by a narrow bridge or isthmus. This isthmus is about one-eighth of an inch broad, and is seen running across the trachea just below the larynx, on about the third or fourth cartilage ring. It is reddish in color, but sometimes very pale. Tracing it round on either side of the trachea, the two lobes are easily found. Each lobe is from 1-1½ inch long, about ¾ inch broad, shaped like an almond, and of firm and compact texture. The color is dark red. Remove the lobes by means of the forceps and scalpel, as free as possible from the surrounding connective tissue, and transfer them at once to the bottle.

To prepare the extract, cut up the glands into transverse slices on a clean glass or earthenware plate which has been rinsed in 5 per cent. carbolic acid solution. All the utensils employed in the subsequent operations must be rinsed in the same fluid. Place the sliced glands in a mortar with some ordinary glass tubing—about two inches to each pair of glands will be found sufficient. Grind the whole up together until the glands are thoroughly disintegrated, then add a mixture of equal parts of glycerin and water in the proportion of one fluid drachm to each pair of glands. The mixture of glycerin and water must be first sterilized by boiling for a few minutes, and then cooled. After well triturating, transfer the contents of the mortar to a stoppered bottle or jar, add a small piece of thymol, and macerate for twenty-four hours. At the expiration of this period, squeeze out the fluid through a piece of muslin, by means of the fingers (previously dipped into 5 per cent. carbolic acid solution), and filter through a double layer of paper under pressure. The paper may be sterilized by immersion in boiling water. Under a pressure equal to about 15 inches of mercury a nearly clear filtrate of a pale red color is obtained, measuring about the same volume as the fluid added to the glands, since the glands themselves exude fluid when pounded in the mortar, and by filtering under pressure very little fluid is lost in the residue remaining on the filter.

If access cannot be had to a pressure filter, one must be content with pouring off the supernatant fluid after the twenty-four hours maceration, because filtration under ordinary conditions proceeds too

slowly. In this case much less extract is obtained, but this defect can be partly remedied by using double the quantity of glycerin and water given above. This will give a distinct layer of fluid which can be easily decanted from the residue. Care must be taken to see that it is free from solid particles of all but the minutest size. Fifteen minims of the stronger or thirty minims of the weaker extract is the quantity employed for each injection. The extract may be kept about seven days in a well stoppered bottle containing a piece of thymol. After this time its injection is followed by some local disturbance, due probably to incipient putrefactive decomposition, which the thymol seems incapable of preventing. Whether the addition of any other antiseptic, of harmless nature, would obviate this effect, has not yet been determined.

MICROSCOPICAL EXAMINATION OF PURE AND UNADULTERATED BUTTERS.¹

BY JEAN FERDINAND.

In a paper, read before the Société Française d'Hygiène, the author points out that under the microscope a pure butter shows round, regular, fat cells. If this pure butter has not been carefully prepared, we note, in addition, granular masses of casein and albuminous matters, together with occasionally (especially as this butter does not keep well) the spores or filaments of penicillium. Margarine (animal fat), on the other hand, shows under the microscope crystals, separate or in groups. These crystals are very characteristic, and are seen to much better advantage if examined with polarized light, in which case the crystals show up brilliantly, whilst the ordinary fat cells are dark or black. By using a selenite plate in addition, the effect is still more remarkable—the crystals showing up of different brilliant colors (principally orange and red) upon a blue ground work. Pure butter, melted down and allowed to cool, if examined with a selenite plate and polarized light, shows largish cells, each cell divided into four segments by a black cross. Two of the segments are greenish and two are orange-yellow, whilst the ground-work is violet-blue. We have thus an extremely simple and trustworthy method for the examination of butters with a view to finding

¹ *Journal d'Hygiène*, August; the Medical Chronicle, October 1892, p. 43.

out those adulterated with fats (animal), but it must be remembered that the method is open to errors. Thus, a small amount of melted pure butter may give the characteristics of adulteration. So, too, pure butters that have become rancid. Vegetable fats, again, do not crystallize out like animal fats. Finally, certain butters of *very* inferior quality may give the appearances of adulterated butters; but, notwithstanding all this, the method is a very useful and simple one for deciding *at once* between butters that are manifestly pure, and those which are impure, and may require further examination by means generally adopted by analysts.

ACONITINE.¹

BY A. EHRENBERG AND C. KURFUERST.

The aconitine was purified from a large commercial sample by recrystallization from ether, only the middle fraction being used. The pure alkaloid melts at 193–194° (Dunstan and Ince, 1891, m. p. 181.5°), but the presence of a very small quantity of a decomposition product, which coats the crystals like a varnish and therefore escapes detection, lowers the melting point by 10° and more; for this reason the purification of aconitine by converting it into a salt and decomposing this by an alkali is inadmissible. The authors' formula for aconitine is $C_{32}H_{43}NO_{11}$; Wright and Luff give $C_{33}H_{43}NO_{12}$ (1878); Dunstan and Umney, $C_{33}H_{45}NO_{12}$ (1892). Determinations of methoxyl by Zeisel's method showed 9.92, 9.98 and 10.13 per cent. of methyl as methoxyl; the elimination of four methyl groups from the above formula would give 9.93 per cent.

When hydrolyzed by alcoholic potash, or by water, at 140–150°, aconitine yields a new base, methyl alcohol, benzoic acid and another acid (compare authors quoted). When it is heated with water in a reflux apparatus until it has all dissolved, picroaconitine and napelline are produced, and crystallize from the solution as benzoates; they may be approximately separated by treatment with dilute sulphuric acid, washing with ether to extract the liberated benzoic acid, adding sodium carbonate until there is a slight precipitate and again shaking with ether, which extracts the napelline; the picroaconitine is obtained by digesting the slightly alkaline solid residue with

¹ *J. pr. Chem.* [2], **45**, 604–613; *Jour. Chem. Soc.*, 1892, 1254.

ether. The picroaconitine, $C_{25}H_{39}NO_{11}$,¹ is probably formed from 1 mol. of aconitine by the absorption of 1 mol. of water and elimination of 1 mol. of benzoic acid, and the napelline, $C_{24}H_{37}NO_{10}$, from 1 mol. of picroaconitine, by the absorption of 1 mol. of water and elimination of 1 mol. of methyl alcohol. The mother liquors from the picroaconitine and napelline benzoates contain aconine, $C_{22}H_{35}NO_9$, and acetic acid; this points to the formation of 1 mol. of aconine from 1 mol. of napelline by the absorption of 1 mol. of water and elimination of 1 mol. of acetic acid.

When aconine is distilled with barium hydroxide, paraffin hydrocarbons, methylamine, and an oily compound which boils at about 245° and has an odor of quinoline are obtained. This matter is being further investigated.

The so-called amorphous aconitine of commerce is a variable mixture of aconitine, picroaconitine and napelline.

ON THE VOLUMETRIC DETERMINATION OF THE ALKALOIDS.

BY L. BARTHE.

I have ascertained that the best known alkaloids of vegetable origin are without action upon phenolphthalein, which they leave in the state in which it comes into contact with them; colorless if the medium is neutral or acid, rose colored if it has been rendered alkaline by a mineral base. Such are quinine, cinchonine, cinchonamine, cinchonidine, quinidine, morphine, codeine, cocaine, aconitine (amorphous or crystalline), strychnine, brucine, veratrine, pilocarpine, duboisine, sparteine. On combining this observation (made, I believe, for the first time) with the well-known property of the vegetable bases to turn red litmus blue, I have founded a general method for the volumetric analysis of the alkaloids.

If certain vegetable principles, hitherto regarded as alkaloids, do not react appreciably with phenolphthalein and litmus, it is doubtless because their properties are still imperfectly known, and that their chemical functions require accurate determination. For instance, narcotine, which according to Pictet and Flückiger, can

¹Dunstan and Ince (1891) give to picroaconitine the formula $C_{31}H_{45}NO_{10}$; and to aconine the formula $C_{26}H_{41}NO_{11}$.

scarcely be regarded as an alkaloid and which is without action upon phenolphthalein and litmus, and atropine, which with these substances behaves like a weak acid.

However it may be, the alkaloid to be determined must be brought to the condition of a soluble salt by means of a mineral acid, *e. g.*, sulphuric acid, either in water or in a slightly alcoholic solution. An excess of acid does not prevent the reaction, but on the contrary rather promotes it. The presence of any salt of the alkaline or earthy bases, and even of a certain number of the heavy metals (*e. g.*, zinc), has no effect upon the process.

The following method of operation is very easily applicable to the determination of the alkaloids above-mentioned, and also of the acids with which they may be combined.

Determination of the Acid.—We introduce into a beaker of Bohemian glass $\frac{1}{1000}$ part of an equivalent of the alkaloid or of a salt of the alkaloid, adding 10 cc. of decinormal sulphuric acid in case of a salt, or 20 cc. in case of a free alkaloid. We add 20 cc. of neutral alcohol at 90 per cent., and three or four drops of an alcoholic solution of phenolphthalein. All the salts of the alkaloids dissolve in this acid alcoholic liquid. We then pour in decinormal potassa until there appears a faint rose-colored tint of phenolphthalein. The number of cc. of decinormal potassa used expresses all the acid, free or combined, existing in the mixture. The rose-tint of phenolphthalein appears only when all the alkaloid is in the free state in the liquid; as a transparent solution if the alkaloid is soluble in a weak, neutral alcohol, or as a precipitate if it is insoluble. We have thus a mixture indifferent to phenolphthalein, but alkaline to litmus in consequence of the liberation of the alkaloid.

Determination of the Alkaloid.—Into a second beaker of Bohemian glass we introduce $\frac{1}{1000}$ of an equivalent of the alkaloid, or of a salt of an alkaloid, with 10 or 20 cc. of decinormal sulphuric acid, and then some drops of a sensitive tincture of litmus. The color is then rendered blue again by means of decinormal potassa. The number of cc. of the alkaline liquid employed in this second saturation represents merely the free acid. If this number is subtracted from the figure which in the foregoing operation measures the entire acid, it expresses exactly the quantity of sulphuric acid combined with the alkaloid in the state of a basic salt, and consequently the weight of the alkaloid itself. It is, in fact, sufficient to

multiply the remainder from the subtraction by $\frac{1}{10000}$ of the equivalent of the alkaloid in question. The factors are evidently :

For anhydrous quinone,	0'0324
" cinchonine,	0'0294
" codeine H_2O ,	0'0317
" morphine H_2O ,	0'0303

—*Comptes Rendus*, vol. cxv, p. 512; *Chem. News*, Novbr. 4, 1892, p. 223.

CONDURANGIN.

BY G. CARRARA.

Condurangin is a glucoside, first obtained by Vulpinus, from the bark of *Gonolobus Condurango*, and considered by some writers as identical with vincetoxin from *Aselepias Vincetoxicum*. It may be separated into two parts, one of which is soluble in water, the other insoluble. The best method of preparing it, is to extract the bark with 95 per cent. alcohol in a reflux apparatus, filter, distil off the greater part of the alcohol, take up with cold water, filter again, add concentrated solution of ammonium carbonate, and heat gently. The precipitate thus formed is washed with hot water, redissolved in cold water, containing, if necessary, a few drops of alcohol, basic lead acetate added, the precipitate thoroughly washed, suspended in water, and decomposed with hydrogen sulphide: the brown solution obtained is then precipitated with a concentrated solution of common salt. The precipitate, after purification, consists of a mixture of the two modifications of condurangin. Insoluble condurangin is precipitated from a benzene solution on the addition of excess of light petroleum, as a light, almost white powder, which melts at $60-61^\circ$, and has the percentage composition $C_{25}H_{32}O_7$. Its molecular weight, as determined by the cryoscopic method, agrees with this formula.

Soluble condurangin, obtained by the evaporation of an aqueous extract of the mixed varieties, is a yellowish substance melting at 134° . It appears to have the composition $C_{25}H_{32}O_7$, but its molecular weight could not be determined. On boiling either of these compounds with acids, the principal product is a brown, pitchy substance, insoluble in water. With Fröhde's reagent, an aqueous solution of the soluble condurangin yields a greenish coloration, and after a time a flocculent, green precipitate, the insoluble variety, suspended in water, gives no reaction, or only a yellowish coloration.

NOTES RELATING TO THE SOLANACEOUS BASES.¹

BY DR. O. HESSE.

[Concluded from p. 595.]

(5) SCOPOLAMINE.—This name has been provisionally applied by E. Schmidt² to the base, which he considers to be distinct, obtained by Bender from *Scopolia atropoides*, and supposed by him to be hyoscyne. Schmidt has shown that the composition of the base in question is represented by the formula $C_{17}H_{21}NO_4$; that it forms, with hydrobromic acid or with gold chloride, crystallizable salts, having respectively the composition represented by the formulæ $C_{17}H_{21}NO_4 \cdot HBr + 3H_2O$ and $C_{17}H_{21}NO_4 \cdot AuCl_4H$. He has also shown that this base is met with in the ordinary hyoscyne hydrobromide of commerce.

The melting point of the above-mentioned gold salt was found by Schmidt first 214° , afterwards 210° to 212° , and subsequently by Schutte 208° .³ Lastly, the mother-liquor from which the commercial hydrobromide has been obtained, was found to yield a more laminar gold salt, melting at 204° .

More recently, Schmidt⁴ has stated that the commercial hyoscyne hydrobromide consists, almost exclusively, of a salt, the base of which he proposes to term scopolamine; and that this base, when treated with baryta water, is converted into atropic acid, and a crystallizable base, $C_8H_{13}NO_2$, which has the form of colorless needles, melting at 110° .

But, so far as I have been able to ascertain, commercial hyoscyne hydrobromide is nothing else than the true hyoscyne salt, which gives a gold salt melting at 198° , as found by Ladenburg and quite recently also by Liebermann and Limpach. Consequently, the different observations of Schmidt and Schutte on the gold salt, as compared with those of Ladenburg, Liebermann, Limpach and myself, can only be due to accidental circumstances.

It has already been shown that the rotatory power of hyoscyne in alcoholic solution is almost entirely destroyed by the addition of very little caustic soda, two drops of a 30 per cent. solution being sufficient to produce that effect in 25 cc. of the solution of hyoscyne. It is therefore conceivable that the hyoscyne may, in the course of its preparation, have undergone some such alteration as hyoscyamine does. Indeed, hyoscyne, after having been submitted to such treatment, has been found to give a gold salt crystallizing in extended laminae. But its melting point of 200° was only somewhat higher than that of the salt containing the normal base. An explanation of the above difference cannot therefore be furnished as suggested.

Schmidt⁵ has recently published the investigation of scopolamine, of which preliminary notices had previously appeared.⁶ The memoir is dated October 1891; but it contains additions made in the course of the present year, and a

¹ *Annalen der Chemie*, vol. 271, p. 100; reprinted from *Phar. Jour. and Trans.*, September 10 and 17.

² *Apotheker Zeitung*, 1890, No. 30.

³ *Mittheilungen aus dem pharmaceutisch-chemischen Institut der Universität Marburg*, xii, p. 623.

⁴ *Chem. Centralblatt*, 1892, p. 704.

⁵ *Archiv der Pharmacie*, ccxxx, p. 207.

⁶ *Apotheker Zeitung*, 1890, p. 186, and 1891, p. 522.

postscript dated April 12, 1892, refers to the note which had been published by me April 9, 1892,¹ giving a brief statement of the general result of the present paper. Schmidt now explains that commercial hyoscyne hydrobromide is "essentially nothing else" than a salt of the base which he calls scopolamine. I am desirous of completing that explanation by stating that the commercial hyoscyne hydrobromide and the scopolamine hydrobromide in question, as already shown above, correspond, one with the other, not alone essentially but completely. The small differences which Schmidt observed in the gold salt prepared from the commercial hydrobromide, probably do not really exist.

Schmidt makes the further proposition to call this base scopolamine, because the name hyoscyne is used, in chemical literature, as suggestive of a base isomeric with atropine and hyoscyamine. This has indeed been the case for some ten years past; but those are to blame for the practice who have been engaged in the study of this subject, since they have persistently continued, directly or indirectly, to advocate the formula $C_{17}H_{23}NO_3$. Now that this formula has been placed upon a correct footing, all the requirements of the case are, thereby, satisfied, and it would be inappropriate, at the same time, to alter the name of the substance, more especially since the name hyoscyne has long been established in medicine and pharmacy, as well as in trade, while on the other hand, the name scopolamine, which is scarcely known, would first have to become familiar. It is doubtful whether that would ever happen. I am therefore desirous of strenuously urging chemists to adhere to the use of the name hyoscyne, which was selected by Ladenburg for the base in question, and has been in general use up to the present time.

Finally, in reference to the term scopoline, by which Schmidt proposes to designate the corresponding volatile base, it may be mentioned that a glucoside is already understood under this name in chemical literature. Consequently the name cannot be so applied without risk of confusion.

(6) **ATROPAMINE.**—This base was first obtained by me from the mixture of bases constituting crude atropine, and resulting from the treatment of a large quantity of belladonna root. It was not, as stated by Merck, discovered in belladonnine. Since atropamine is precipitated from its acetic acid solution by sodium chloride, while the crystallizable constituents of crude atropine—atropine and hyoscyamine—are not precipitated in that way, the separation of the base from these latter was not attended with much difficulty. Having regard to its characters, it would not therefore be difficult to detect the presence of atropamine in belladonna root from other sources, although the amount present is generally very minute.

I have now only to add to my previous communication² on this subject that the platinum salt of atropamine can also be obtained from a cold concentrated water solution, as pale yellow scales, melting with decomposition, at 203° to 204°.

In regard to the base resulting from the splitting up of atropamine, it cannot, according to what has been stated above, be the pseudotropine discovered by Ladenburg, or oscine, since that has a totally different composition from the base in question. On the other hand, it cannot be tropine, because the melting

¹ *Pharmaceutische Zeitung*, 1892.

² *Annalen*, cclxi, p. 87.

point of the platinum salt is essentially lower than that of the tropine salt. It is true Kraut¹ has stated that the platinum salt of tropine has different characters according to the mode in which the splitting up of atropine is effected; but even that circumstance would not be of much assistance, because the volatile bases from tropine and from atropamine, as well as their platinum salts, were prepared under precisely the same conditions and compared with each other. So long as the accuracy of these observations is not experimentally disproved, the base obtained by the splitting up of atropamine must be regarded as being distinct from tropine. In order to obviate erroneous conceptions in respect to this matter I therefore designated that base β -tropine.

I have further examined the small remnant of platinum salt, as follows: After three times recrystallizing from water the melting point of the salt was found to be 187°. A portion dissolved in water was decomposed with sulphuretted hydrogen, the clear filtered solution evaporated, the crystallized residue dissolved in water, mixed with caustic soda and the base shaken out with chloroform. The clear chloroform solution gave on evaporation long colorless crystals of β -tropine, which covered the sides of the vessel like ice crystals. In moist air they soon deliquesced. Dried in the exsiccator the base melted at 60° to 61°. Heated to 53° in the exsiccator it soon vaporizes; it is readily soluble in water; on adding platinum chloride to the solution and evaporating, the platinum salt crystallizes out in the original form and melts at 186° with decomposition.

For the sake of comparison, I have prepared tropine from atropine, and operated with its chloroform solution under exactly the same conditions described above. The crystals, obtained on evaporating the solution, did not present more than scanty indications of the ice crystal form; but were flat and often spear-shaped needles that were apparently quite as hygroscopic as those of β -tropine. On the other hand, it was found that tropine vaporizes but very little under the same conditions.

The difference between these two forms of tropine consist, therefore, so far as can be at present made out, chiefly in the melting points of the platinum salts and the greater volatility of β -tropine.

(7) *BELLADONNINE*.—Under this name Hübschmann² understands a base the sulphate of which is contained in the mother liquor left in the preparation of atropine sulphate. The belladonnine was separated from the salt by alkali, and was, like the sulphate, amorphous. Merck understands belladonnine to be the base from the mother liquor which, in the preparation of atropine, gives no further crystallizable base. He is also of opinion that the crude belladonnine examined by Dürkopff³ had been, in part only, derived from belladonna root, on account of the considerable amount of hyoscyne it contained. Kraut⁴ showed that belladonnine is but little decomposed by boiling with baryta water, and he thus pointed out a mode of obtaining this base in a state of purity. By the splitting up of a base purified in that way, Merling stated that he had obtained tropine; but his investigation was limited to the determination of the

¹ *Ibid.*, cxxxiii, p. 97.

² *Schweizerische Zeitschrift für Pharmacie*, 1858, p. 123.

³ *Berichte*, xxii, p. 3183.

⁴ *Annalen*, cxlviii, p. 239 and *Berichte*, xiii, p. 165.

crystalline form and the amount of platinum of the platinum salt. He gave $C_{17}H_{21}NO_2$ as the formula of this base.

I have already been able to show that atropamine is readily convertible by the action of baryta water, as well as hydrochloric acid into belladonnine; and that the base, so obtained, possesses characters which correspond well with Merling's description of belladonnine. I may here add that by repeatedly evaporating a solution of atropamine hydrochloride, at about 80° , the atropamine salt may be quantitatively converted, slightly acidulated with hydrochloric acid, into hydrochloride of belladonnine. When, likewise, a solution of atropamine hydrochloride in moderately concentrated hydrochloric acid, is warmed, the splitting up of the atropamine is preceded by its conversion into belladonnine, which may be separated, as hydrochloride, by precipitation by sodium chloride. In both instances there is obtained belladonnine hydrochloride, which is amorphous, and may be distinguished from the original atropamine hydrochloride by its behavior with platinum or gold chlorides.

(8) APOATROPINE.—This base was obtained by Pesci,¹ by the action of nitric acid upon atropine; and also by Ladenburg,² by repeatedly evaporating a solution of tropine atropate, mixed with dilute hydrochloric acid. Ladenburg named the base atropyl-tropeine. Merck obtained apoatropine as a secondary product in the preparation of atropine; it was therefore probably produced by the action of an acid upon the atropine. According to Pesci, it is rapidly converted into atropic acid and tropine when boiled with baryta water, and in this respect it differs from belladonnine, as well as from atropamine. Otherwise it possesses, according to Merck, apparently, the same characters as atropamine, though with the following differences:

<i>Apoatropine.</i>			
Free base,	Needles,	melts at	60° to 62°
Hydrochloride,	Laminæ,	"	237° to 239°
Platinum salt,	Scales,	"	212° to 214°
Gold salt,	Long needles,	"	110° to 111°
<i>Atropamine</i>			
Free base,	Amorphous,	melts below	60°
Hydrochloride,	Laminæ,	"	at 236°
Platinum salt,	Scales and needles,	"	at 203° to 204°
Gold salt,	Brilliant laminæ,	"	at 112°

As a further distinction between apoatropine and atropamine, it may be mentioned that apoatropine is produced by the action of dilute hydrochloric acid; while atropamine is, in that way, destroyed and converted into belladonnine. Hence it is evident that, notwithstanding Merck's assertion, atropamine cannot be identical with apoatropine.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, November 15, 1892.

The meeting was called to order; E. M. Boring, Ph. G., was elected Chairman, and the reading of the minutes of the October meeting was dispensed with.

¹ *Berichte*, xv, p. 530, and *Gazetta Chim.*, xi, p. 538; xii, p. 60.

² *Annalen*, cxvii, p. 102.

Dr. Lowe read a paper upon the *use of compressed gases in medical practice*. The gases used most are oxygen and nitrogen monoxide, the latter being that which is advertised as compound oxygen by medical quacks. An apparatus for the inhalation of gases, constructed by the White Dental Co., of Philadelphia, was also exhibited and its uses explained.

The reading elicited a good deal of discussion. Mr. Beringer stated that other gases beside those mentioned were in use for medical purposes, sulphuretted hydrogen and chlorine being of the number.

Prof. Trimble said that air and oxygen had been liquefied and exhibited at a meeting of the Royal Institution, London; both were then passed around the meeting in glasses, those handling them being cautioned not to touch the glass, but only to take hold of the handle made of a non-conducting material, as the temperature was -180° C. in one case and -192° C. in another. The atmosphere, compressed, would make a sea thirty-five feet deep around the globe.

Mr. McIntyre stated that medication by means of compressed gases had been found efficacious, but that there were many persons who did not know how to inhale them.

Liquefied ammonia, another of the compressed gases, may be expected to work great changes in connection with practical pharmacy, as a means of refrigeration.

The use of compressed carbonic acid was also discussed, as a means of aerating beverages, and inquiry was made whether it was safe to use it; the reply was that the company which operate Leffman's patent for making carbonic acid from magnesite test their cylinders to 4,000 pounds, and charge them up to 1,000 pounds pressure.

Nitrous oxide gas cylinders like those exhibited have one hundred gallons of gas compressed into them, and are cooled to 5° C. The amount of gas that is contained in the cylinders is estimated partly by the pressure and partly by the weight; the weight of oxygen contained in a cylinder is said to be $7\frac{1}{2}$ ounces.

One of the advantages claimed for the compressed gases is great portability. Some are quite valuable as fire extinguishers, like carbonic acid, and sulphurous acid. Chloroform was stated to be of value for extinguishing petroleum fire, but no experiments seem to have been made on a large scale for such purposes. Chloride of ethyl compressed in tubes with capillary orifice has been used for local anæsthesia, and its value for this purpose was possibly due to local refrigeration.

Professor Maisch read the copy of an American prescription which had been sent to him from Europe, where it had been presented to be compounded, one of the articles called for being *jurebebine*. He stated that jurebebine was isolated by Dr. Greene, of the U. S. Navy, in 1878, from the green fruit of a solanum indigenous to Brazil, and that the name jurubeba or juribeba was used in that country for several species of solanum and other solanaceous plants, among them being *Sol. paniculatum*, *S. toxicarium* and *S. insidiosum*. The leaves were stated by Peckolt to be used as an infusion, of the strength of 2 gm. to 500 gm. of water, and given in doses of a wineglassful four times a day. Dr. Greene has shown that the alkaloid is not identical with solanine.

It was stated that the prescription in question was sent out by an advertis-

ing quack, that the ingredients varied sometimes, and that such articles like jurubebin which are not in the market, were simply ordered as a blind with the view of compelling the victim to have the prescription compounded by the advertiser.

The question was asked, to what extent should pharmacists comply with the directions of physicians when A B's or X Y's make of any special article is ordered?

Professor Maisch said that the physician's order should be complied with; but that it had been his practice to decline putting up prescriptions ordering galenicals of other manufacturers, and at the same time to let physicians know that he took pride in making such articles himself, and that such notification was generally satisfactory to the physician.

It was suggested that medical men could and in most cases would cure the trouble, if apothecaries would let them know that they had such remedies on hand of their own make, and that they were well and properly made. Mr. Beringer said we ought to comply with the prescription of the physician, and if making a similar preparation should acquaint the physician with the formula generally the physician would be satisfied with it.

On motion adjourned.

T. S. WIEGAND, *Registrar*.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

All Around the Year, 1893. Designs by J. Pauline Sunter, Boston. Lee & Shepard. Price, in box, 50 cents.

This calendar, like its predecessors, is printed on heavy card-board, gilt edged, with chain, tassels, and ring, and is of convenient size. The designs on each monthly card, are very pleasing, artistically executed, and printed in several colors.

Grasses of the Pacific Slope, including Alaska and the adjacent islands. Part I. By Dr. Geo. Vasey, Botanist U. S. Department of Agriculture. Washington: Government Printing Office. 1892. 4to.

In continuation of the work done in regard to the grasses of the southwestern United States, the concluding portion of which was announced on p. 110 of our present volume, the pamphlet now before us has been issued in the same style as the former. We learn that the grasses of the Pacific Slope, including Alaska, number nearly 200 species, specifically distinct from those growing east of the Mississippi. There are 50 plates with 52 species, most of them illustrated for the first time; the descriptions are mostly the work of Prof. L. H. Dewey.

Contributions from the U. S. National Herbarium. Vol. I, No. V. Published by authority of the Secretary of Agriculture. Washington: Government Printing Office. 1892.

The pamphlet contains lists of plants from different collectors obtained along the western coast of America, from Patagonia northward; also a revision of the North American species of *Hoffmanseggia*; and an index of new species of American phanerogams and pteridophytes published in 1891. This index, prepared by Josephine A. Clark, is in two parts, systematic and alphabetic, and covers 36 pages.

Formulaire de l'Antisepsie et de la Désinfection, par H. Bocquillon-Limousin, pharmacien de 1^{re} classe, etc. Avec une introduction par le Dr. Verchère, chirurgien de Saint-Lazare. Paris : J. B. Baillière et Fils. 1893. 16mo. Pp. viii and 298. Price, 3 francs.

Formulary on antiseptics and disinfection.

This is a companion volume to the one by the same author noticed on page 334 of our June number, and in which the subject of antiseptics and antiseptics could be but briefly treated. In the present work we find five chapters, of which the first treats of the influence of various agents upon the disease-producing microbes, which is followed by a compilation of the antiseptics recommended by eminent physicians and surgeons for various organs and different classes of disease. The third chapter gives the different forms of antiseptic preparations with the necessary formulas, and in the fourth chapter the antiseptic agents are briefly described in alphabetical order. The concluding chapter treats of the various methods of disinfection, more particularly as applied to the person, to furniture, rooms, etc., to the sterilization of water, milk, and other liquors, and to the precautions recommended in cases of various epidemics. As will be noticed the subject-matter is quite comprehensive ; but though necessarily the account under each heading is brief, nothing that might be of practical value appears to have been omitted ; hence the little work will be found of much usefulness in all cases where disinfectants or antiseptics are indicated.

Over one thousand Prescriptions or favorite Formulas of various Authors, Teachers and Practicing Physicians, the whole being carefully indexed and including most of the newer remedies. Published by The Illustrated Medical Journal Co., Detroit, Mich. Pp. 132. Price, \$1.

The prescriptions have been collected from various sources, and are printed without any special order, but can be readily consulted through the copious-index of diseases. Each printed page is faced by a blank page, which may be used for notes intended to be preserved.

Sur le Dadi-go ou Balancounfa, plante nouvelle cléistogame et distopique, usitée comme ténifuge sur la côte occidentale de l'Afrique tropicale. Par M. Édouard Heckel, Professeur à la Faculté des Sciences de Marseille et à l'École de Médecine.

On Dadigo or Balancounfa, a new cleistogamous and distopic plant, used as a ténifuge on the west coast of tropical Africa.

A reprint from the *Annales de la Faculté des Sciences de Marseille*, 1891, with three plates. The plant in question has been named by the author *Ceratanthera Beaumetzi*. From his experiments it appears that the ténifuge properties are due to the volatile oil.

Sur la Graine d'Owala. Par le Docteur Ed. Heckel. On owala seed.

A reprint from *Répertoire de Pharmacie*, August, 1892. The seed is obtained from *Pentaclethra macrophylla*, Benth., a tree of the order leguminosæ, indigenous to Western Africa. The seeds yield 36 per cent., or after the removal of the integuments, 44 per cent. of a valuable butyrateous fat which melts at 24.8° C.

Ueber Zersetzbarkeit des Chloroformium medicinale Pictet. Von E. Biltz.

On the decomposition of Pictet's medicinal chloroform.

The author shows that chloroform, deprived of alcohol in the cold, suffers decomposition by light and air as rapidly as such, which after the removal of the alcohol is distilled. (See July number, p. 391).

Address by Albert B. Prescott, retiring President, before the American Association for the Advancement of Science. Pp. 16.

"The immediate work in chemical science" is the subject of this address, which was delivered at the Rochester meeting of the Association in August, 1892.

Tuberculin and the Living Cell. By Chas. Dennison, A.M., M.D., Professor of Diseases of the Chest and Climatology, University of Denver, etc. Pp. 24.

A reprint from "The Medical News" of September 17, bearing the explanatory title "An inquiry as to how one aids the other in the fight against tuberculosis."

Le Chloral et ses Dérivés. Par M. J. B. J. Roussel. Coulommiers. 1892. 4°. Pp. 110.

Chloral and its derivatives.—A very interesting and full review of the chemistry and application of chloral and its numerous derivatives, presented as a thesis to the École supérieure de Pharmacie at Paris.

Sur quelques nouveaux Chlorures doubles. Par M. Chassevant Allyre. Paris. 1892. 4°. Pp. 41.

On several new double chlorides is the title of this thesis, treating of the double chlorides of lithium with manganese, iron, nickel, cobalt, copper, cadmium and tin, prepared by the author. A review of the literature on double chlorides of other alkali metals is also given.

Sur la Puissance et le Grossissement de la Loupe et de la Microscope. Par Julien Lefèvre, professeur suppléant à l'École de Médecine de Nantes. 1892. 4°. Pp. 27.

A thesis presented to the Paris School of Pharmacy for the degree of "Pharmacien de 1^{re} classe," and treating of the power and amplification of the lens and of the microscope.

Minutes of the Fortieth Annual Meeting of the American Pharmaceutical Association. Pp. 154.

The pamphlet was issued to the members in advance of the bound copy of "Proceedings," and contains the minutes of the general sessions and of the Section on Commercial Interests, including the various reports rendered to these bodies. A second pamphlet containing the minutes of the Sections on Scientific Papers and on Legislation and Education, and covering 240 pages, was distributed early in December.

VARIETIES.

Potassium permanganate has been recommended by Bokai (*St. Petersburg med. Woch.*) as an antidote in phosphorus poisoning. Dr. Hognos, of Budapest (*Gyógyaszat*, 1892, No. 2) has treated two cases of phosphorus poisoning successfully with the permanganate, though in both cases large quantity of phosphorus had been taken. In each the stomach was first washed out with tepid water, and then 15 ounces of a $\frac{1}{10}$ per cent. solution of permanganate of potash injected into the stomach and left there. — *The Med. Chronicle*, September, 1892.

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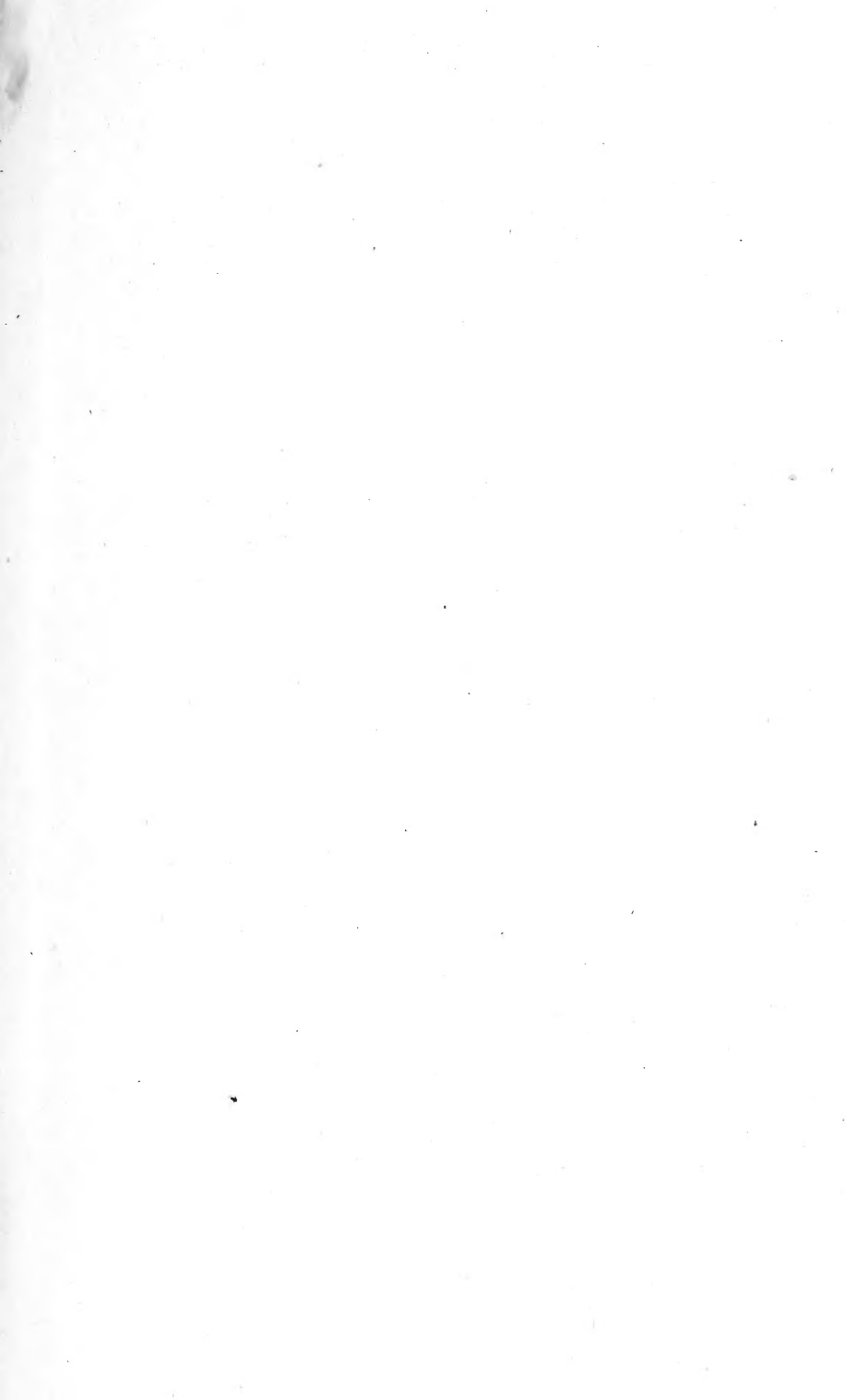
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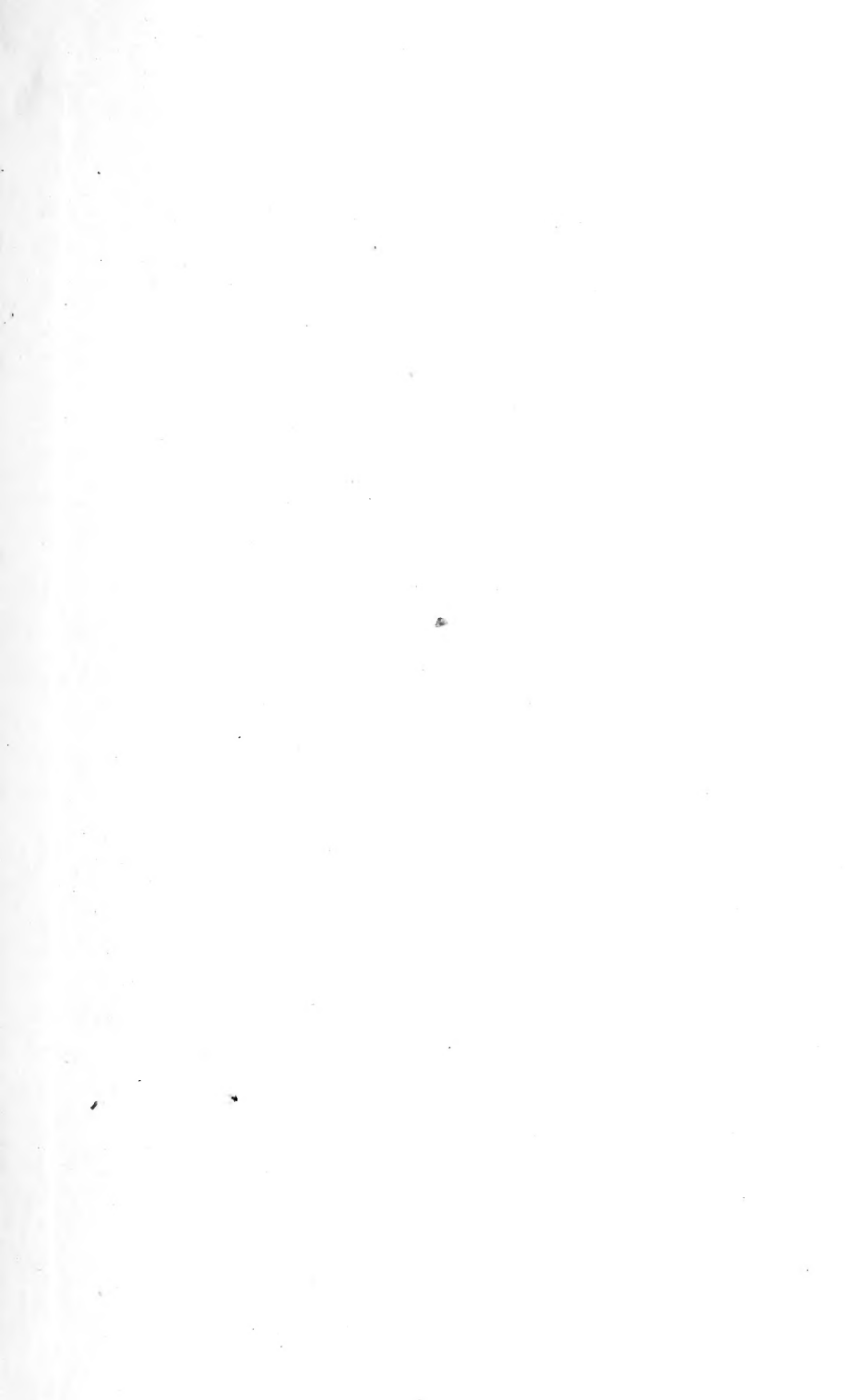
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